

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Management of Steam in Factories.

(Continued.)

Before continuing our description of the boilers and steam fittings in use in the factory of Messrs. Bliss & Williams, we desire to correct an error which occurred in the early part of the article published in last week's issue. In asserting that the apparatus was designed especially for hard coal, we inadvertently omitted after hard coal the words, "and coke." Messrs. Bliss & Williams are at present using the apparatus with gas coke exclusively, as will be seen by the continuation of the article below.

Steam having been obtained in the most economical manner, the next important points demanding attention are the methods by which it is to be distributed and used. In the case in hand all the steam is taken to the engine, and, with the exception of the small quantity of steam taken to the office radiators, all that is used for heating is obtained by utilizing the exhaust. A 3 1/2-inch pipe carries steam to the engine. This pipe is protected by some 2 1/2 inches of felt and paper, so that the external diameter of the pipe is rather more than 8 inches. The arrangement of the layers is similar to that shown in Fig. 6. With such a thickness

other is placed in the ground under the engine-room floor, to answer as a tank from which the pump draws its supply of water for feeding the boiler.

The drip pipe from the coils, seen near the center of the old boiler, brings all the water of condensation from the steam pipes, radiators, coils and steam apparatus in the factory. This is its chief source of supply. The main steam pipe has a drip which drains all the water which may be formed in it during the night. Into this drip are brought the pipes leading from the cylinder cocks, and the pipe is then led into the boiler.

The exhaust leaves the engine in a thickly-jacketed pipe and goes into a heater, shown on the left in Fig. 5, which has 45 feet of 1 1/2-inch pipe for heating the feed water. It then rises in a 5-inch pipe to the roof, where it is turned over so as to exhaust into the small boiler, from which a drip leads down to the old boiler tank under the floor. Half way up the pipe is a stop valve, and just below it a branch which leads to the coils in the main building.

The pipe as far up as the stop-valve and the branch which leads to the radiators have a very thick covering of felt, asbestos, &c. The arrangement of the clothing is shown in

pressure will distribute steam through about 1600 feet of properly constructed pipes, while scarcely any observable pressure will be needed to drive it through 1000 feet of 4-inch pipe.

Usually men working at the bench make much complaint that steam heat is uncomfortable. The hot air rising from the pipes strikes the underside of the bench and escapes upward at the edge, just at the point where the workman is standing. The result is that the lower part of the body is kept in a constant perspiration and in general discomfort.

The bench adopted by Mr. Jordan, and shown in Fig. 8, does away with this trouble, while it is at the same time a first-class bench. Along the outside wall is placed a 4 by 4-inch stringer, A in Fig. 8, held in place by bolts passing through the wall and secured on the outside by star washers, B. On these are bolted cross pins, whose outer ends rest upon the posts D, 4 inches square, in the usual fashion. Three-inch plank, laid upon the outer one, is 14 inches wide and of hard wood; these complete the bench. At the back a board, 6 inches wide, finishes the bench and leaves a space of 5 inches between the back of the bench and the wall. This space is shown at E. The heated air, in-

chief export to the United States was coffee, valued at \$30,000,000. Of the 1456 foreign vessels entering the harbor at Rio, only 171 were American. Roach's line of steamers is the only one plying regularly between the United States and Brazil. The Canadians have made arrangements for a line between Halifax and Rio. An exhibition of Canadian products is to be opened at Rio de Janeiro next June.

Copper Rolling Mills for the Pacific Coast.

The Mining and Scientific Press publishes editorially the following plea for the building of copper rolling mills at San Francisco, California:

There has never been a period during the existence of the mining industry of the Pacific slope in which a more propitious time could be found than the present for the establishment of rolling mills for the production of the various marketable forms of copper. The workings of the copper mines of the world have heretofore produced so large a supply as to greatly exceed the demand, and the result was seen in the reduction of the price, which placed a check upon them. But the demand has so greatly

speedily and economical character of the transit to them, would also conduce to a still greater activity in the mining department.

No one rolling mill would be able to work up all the metal that would be produced; this industry once inaugurated, other mills would be called into existence to work up the accumulating copper. Nor would this be detrimental to the first in the field. The copper consumed on the Pacific coast would demand the full working capacity of several mills to supply the needed quantity. Even if an excess over the home demand should be produced, the inter-continental markets would be open to the producers, and they could be supplied at lower rates from this section than from elsewhere, on account of the facilities of production and the difference in freight charges.

Sheathing metal could be sold at San Francisco at a much less price than now, and afford a fair business profit to the manufacturer. A reduction in its price would lead to an enlarged consumption; the same might be said with truth in regard to bolts, rivets and nails. The factories and mines of California consume a large amount of rivets for their bolting, and their sale alone would be a leading feature in the trade.

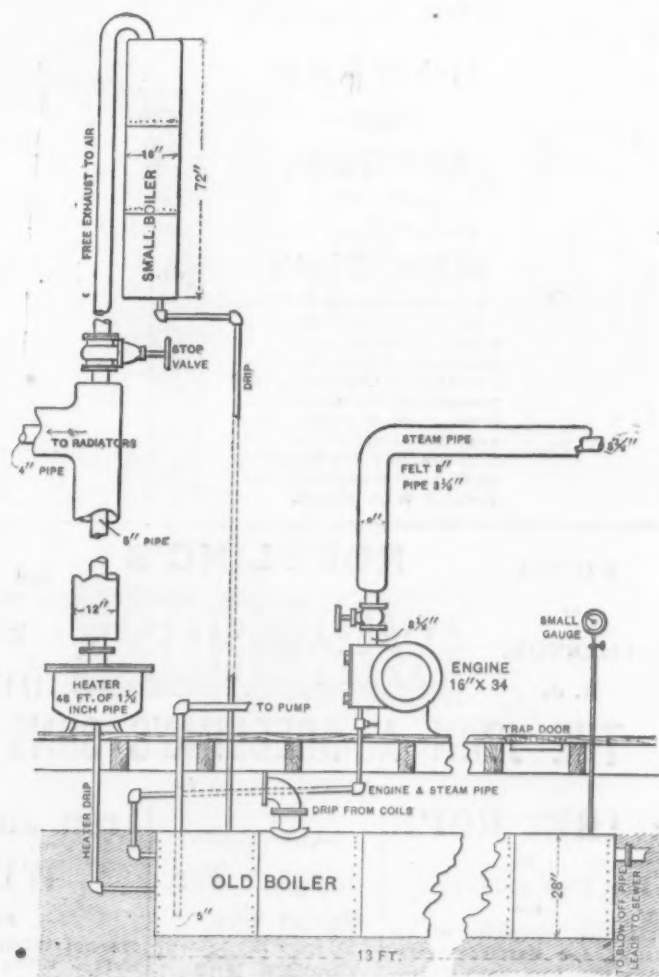


Fig. 5.—Arrangement of Pipes and Tanks to Save Hot Water.

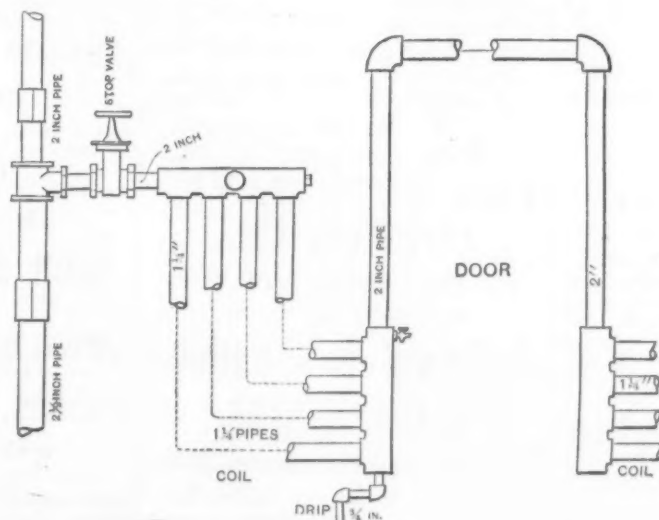


Fig. 7.—Arrangement of Steam Coils and Drips.

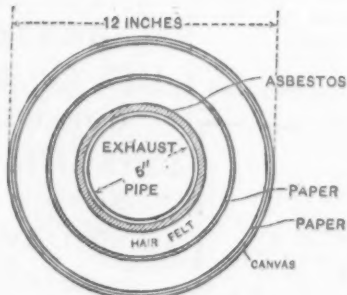


Fig. 6.—Section of Exhaust Pipe and Jacket.

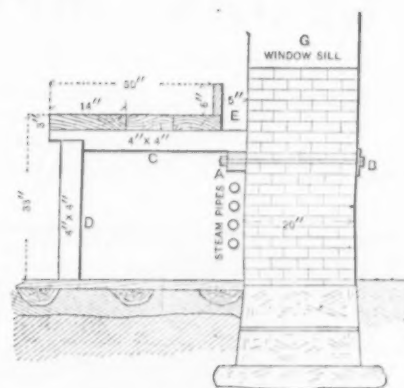


Fig. 8.—Steam Coils Under Benches.

MANAGEMENT OF STEAM IN FACTORIES.

of covering the loss of heat from such a pipe would be a mere nothing, not amounting to more than 8 or 10 per cent. of that of a bare pipe.

Having got the steam to the engine, the supposition is that in the engine itself it will be used with the greatest economy. If we increase the back pressure for the purpose of heating, it is because it is more convenient to use the low pressure steam thus obtained than it would be to take in steam from the boiler.

Low pressure steam, it is very generally admitted, is much more desirable for heating purposes than that of a higher pressure and temperature. It throws less strain on the joints and cocks, and can be made by condensation to give out all the heat that is needed. It is easy to see that there is some economy in putting a few extra pounds of back pressure upon the engine, and taking the whole of the exhaust for the heating. To do this with the greatest economy, the whole of the drip must be returned to the boiler, and we find that not a drop of water is allowed to escape that can be by any means carry any heat away with it.

The first requisite in saving all the hot water produced is to have a large and well protected tank. The factory being located in the midst of the boiler and machine shop district of Brooklyn, it was found that the cheapest tanks to be obtained were old boilers. Two of these were bought for a price but little exceeding their value as scrap. At the present moment they would probably sell for more than they cost.

Fig. 5 shows how these boilers were placed and the general arrangement of the steam and drip pipes in the engine room. The small one on the roof acts as a drip and condenser for the exhaust, while the

Fig. 6. The inside layer is asbestos; then comes a thick layer of hair felt. This is wrapped in paper and another layer of felt put on outside. Paper and canvas inclose the whole. The pipe is 5-inch, but the outside diameter of the whole amounts to 12 inches. Through such a body of non-conducting material, heat passes so slowly that it may almost be said to be impervious.

When it is desired to heat the building the exhaust is turned to the coils by shutting the stop-valve seen in Fig. 6. From the time that the steam leaves the engine room, the drip is all carried forward. With rare exceptions both air cocks and drips from the coils lead into the return pipes, so that there is no annoyance of blowing off steam into the building.

The main distribution of the steam in the factory is made upon the under side of the second floor, each system of coils having a single rising main to itself, arranged so that it may be cut off at pleasure from the others. Most of the coils are made in about 100-foot lengths. On one side of the building, however, there are doors which necessitate the breaking in two of some of the coils. Fig. 7 illustrates how this is done, as well as the manner in which the coils and details of the pipes are arranged. The sections on each side of the door are made independent, although the one on the right is fed from the other. There are in all about 4000 feet of 1 1/2-inch pipe in the coils. The contents of the building to be heated is 265,000 cubic feet. The distribution of the steam is begun with 4 inch mains, which are reduced as the extremes are reached. Large sizes of pipes are used with the especial purpose of reducing the back pressure upon the engine. It is calculated by those who make steam heating a study, that five pounds

stead of flowing out in a stream against the legs of the workman while a descending draft of cold air from the windows cools the upper part of his body, meets with the cold air from the window G, giving a very pleasant heat without any disagreeable results. Incidentally, there is a gain in having more light under the bench, which is, on that account, less likely to have a rubbish heap beneath it out of the way and out of sight and reach. The holes necessary for holding the stringer were made by building pieces of iron rod into the wall at the proper height and withdrawing them before the mortar was hard.

The duty performed by this boiler and heating apparatus in this factory is very satisfactory. We have not accurate figures which would enable us to institute a comparison between the economy attained here and that commonly obtained, but we know that the expense account is small. The whole cost of steam power, including engineer's wages and five chaldrons of coke, amounts to a little less than \$4.50 per day—a figure so small as to leave but little margin for further saving.

Trade with Brazil.—The United States Consul-General at Rio de Janeiro, in a dispatch dated November 29, 1879, transmitting the annual report of the trade of Brazil, says: "The traders from the United States, who arrive by every steamer from New York, manifest industry and enterprise. The imports from Great Britain during the last year amounted to about \$12,000,000; from France, \$6,000,000, and from the United States, about \$4,000,000. Of the 453,734 barrels of flour imported, 394,954 barrels were from the United States. The

increased, owing to the enlarged requirement for articles of copper, both in the arts and in domestic uses, that the price has already advanced over 40 per cent. for ingot copper, that being the form in which the metal is put upon the market, and from which all subsequent forms are produced.

The copper mines of this coast are now being brought into activity, and those now worked are producing an ample supply for extensive rolling works. On this score there need be no apprehensions of an insufficient yield to keep more than one large establishment fully employed. Prominent among the copper mines of the Pacific coast are the San Francisco Copper Co.'s mine; the Battle Mountain mine; the Newton copper mine; the Eagle copper mine, and several others. The San Francisco can produce about 60 tons per month of precipitated copper; the others could probably be wrought up to a similar quantity, if not to a greater amount. Besides those named there are many mines that would be worked to advantage if there was a home market for the copper or for the ore. The expense of sending the ore abroad to be reduced to metal has been, and still is, so great as to amount to a prohibition of shipping it, except in choice lots of exceptionally rich ore. Low grade ores would entail a loss to the shipper who should send them abroad; while if reduction and rolling works were established at some central point, even the moderate profits which accrue to the miners from their sale would be a sufficient inducement for the continued development of the mines, more especially when the hope of obtaining a higher grade of ore was at all reasonable. The better price which they would obtain by the sale of the mattes, or of the precipitate, at the reduction works, combined with the more

The field is a wide one, and as the industries thrive and the population of the far West increases, there must be a corresponding increase in the demand of manufactured copper. This branch of industry presents unusual attraction for the investment of capital, not only from the certainty of sale of its manufactures, with an increasing market, but also from the fact that the intrinsic value of the material used cannot deteriorate while the goods are on hand.

A Large Steel Steamship.—The Inman Steamship Company have awarded to the Barrow Shipbuilding Company the contract for the building of the City of Rome, which is intended to be the finest and the largest ocean steamship afloat, excepting the Great Eastern. She is to be of 8700 tons measurement, and to be constructed of steel upon the cellular or double bottom system, with two longitudinal bulkheads through the boiler and engine spaces, and eleven transverse bulkheads. The dimensions are to be 546 feet in length on the keel, 590 feet long over all, 52 feet beam and 38 1/2 feet depth from the main deck. She will have four iron masts, three funnels, three pairs of inverted direct-acting compound engines, eight boilers and 48 furnaces, with an estimated speed of 18 1/4 knots an hour, having a power of 8500 horses. The saloon and staterooms are to be luxuriously furnished. There will be accommodations for 300 saloon and over 1000 steerage passengers.

Dr. Percy, the veteran lecturer on metallurgy, has resigned his professorship at the Royal School of Mines, London, apparently because he objects to the removal of the institution to South Kensington.

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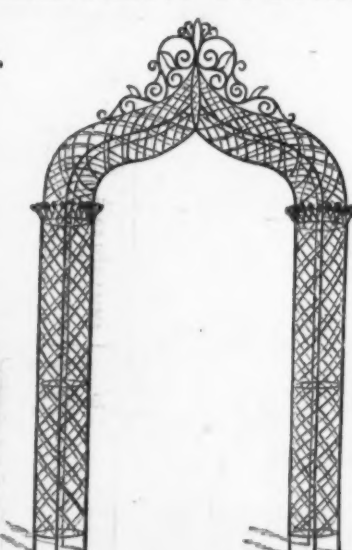
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NEW YORK.



Melting Iron with Coal and Coke in Foundry Cupolas.

BY EDWARD KIRK.

I received several inquiries lately from foundry men who have been accustomed to melting with coal as to how many pounds of iron can be melted to the pound of coke, and as to how a cupola should be charged when melting with coke; and from foundry men who have been accustomed to melting with coke I have received the same inquiries about melting with coal. All this information, together with accounts of melting and descriptions of the methods of charging cupolas with coal and coke in various foundries, will be found in my work, "The Foundry of Metals," and below I give an accurate account of a week's melting done in two of our leading stove manufactories. In each of the statements is given the amount of fuel in the bed, the amount of fuel in each charge, and the amount of iron on the bed and on each charge of fuel. The cupola used by the Excelsior Manufacturing Company is a round one, with a shell 6 feet 2 inches in diameter. It is lined with 8-inch brick to about 12 inches above the tuyeres, and with 6-inch brick from there up. Seventy-two small round tuyeres arranged in four superposed rows are used in this cupola, and are supplied with air from an air chamber surrounding the cupola. The cupola used by Rathbone, Sard & Co. is a round one, with a shell 6 feet in diameter, lined with 6-inch brick from the bottom up. Eight oval tuyeres arranged at equal distances apart are employed in this cupola.

Melting done with coke at the foundry of the Excelsior Manufacturing Company, at St. Louis, Mo., for the week ending August 25, 1877. Table showing the amount of coke required to melt iron and their mode of charging the cupola when melting with coke. In these heats 40 pounds of coke are counted to the bushel and the coke was the best Connellsville.

Date.	No. of charges.	Bushels Coke to charge.	Total Bushels Coke.	Lbs. Iron to charge.	Total Lbs. Iron.
Aug. 20.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,250	12,000
	17	—	149	—	51,200
Aug. 21.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,250	13,000
	17	—	149	—	52,000
Aug. 22.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,000	12,000
	1	10	10	4,300	4,300
	18	—	159	—	55,300
Aug. 23.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	6	7	42	2,900	17,400
	19	—	153	—	56,400
Aug. 24.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	6	7	42	4,733	16,400
	19	—	161	—	55,400
Aug. 25.....	1	45	45	3,000	3,000
	5	6	30	3,000	15,000
	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
	4	7	28	3,375	13,500
	17	—	149	—	52,900

NOTE.—The first charge in each table is the bed charge.

Melting done with Lehigh coal at the foundry of Rathbone, Sard & Co., at Albany, N. Y., for the week ending Sept. 6, 1877. Table showing the amount of coal required to melt iron and their mode of charging the cupola when melting with coal:

Date.	Lbs. Coal in bed.	Lbs. Iron on bed.	Lbs. Coal in bed.	Lbs. Iron on bed.
Aug. 31, 1877.	2,400	7,200	2,400	7,200
First charge coal.....	400	3,600	400	3,600
Second ".....	250	3,600	250	3,600
Third ".....	400	3,600	400	3,600
Fourth ".....	400	3,600	400	3,600
Fifth ".....	400	3,600	400	3,600
Sixth ".....	400	3,600	400	3,600
Seventh ".....	400	3,600	400	3,600
Eighth ".....	400	3,600	400	3,600
Ninth ".....	100	1,000	100	1,000
Total coal used.....	5,550	Total iron melted.....	37,000	

Date.	Lbs. Coal in bed.	Lbs. Iron on bed.	Lbs. Coal in bed.	Lbs. Iron on bed.
September 3, 1877.	2,400	7,200	2,400	7,200
First charge coal.....	400	3,600	400	3,600
Second ".....	250	3,600	250	3,600
Third ".....	400	3,600	400	3,600
Fourth ".....	400	3,600	400	3,600
Fifth ".....	400	3,600	400	3,600
Sixth ".....	400	3,600	400	3,600
Seventh ".....	400	3,600	400	3,600
Eighth ".....	400	3,600	400	3,600
Ninth ".....	100	1,000	100	1,000
Total coal used.....	5,550	Total iron melted.....	37,000	

Date.	Lbs. Coal in bed.	Lbs. Iron on bed.	Lbs. Coal in bed.	Lbs. Iron on bed.
September 5, 1877.	2,400	7,200	2,400	7,200
First charge coal.....	400	3,600	400	3,600
Second ".....	250	3,600	250	3,600
Third ".....	400	3,600	400	3,600
Fourth ".....	400	3,600	400	3,600
Fifth ".....	400	3,600	400	3,600
Sixth ".....	400	3,600	400	3,600
Seventh ".....	400	3,600	400	3,600
Eighth ".....	400	3,600	400	3,600
Ninth ".....	100	1,000	100	1,000
Total coal used.....	5,550	Total iron melted.....	36,400	

Date.	Lbs. Coal in bed.	Lbs. Iron on bed.	Lbs. Coal in bed.	Lbs. Iron on bed.
September 6, 1877.	2,400	7,200	2,400	7,200
First charge coal.....	400	3,600	400	3,600
Second ".....	250	3,600	250	3,600
Third ".....	400	3,600	400	3,600
Fourth ".....	400	3,600	400	3,600
Fifth ".....	400	3,600	400	3,600
Sixth ".....	400	3,600	400	3,600
Seventh ".....	400	3,600	400	3,600
Eighth ".....	400	3,600	400	3,600
Ninth ".....	100	1,000	100	1,000
Total coal used.....	5,550	Total iron melted.....	36,400	

* Published by David Williams, 83 Reade Street, New York. Price \$2.50.

September 6, 1877.

Date.	Lbs. Coal in bed.	Lbs. Iron on bed.	Lbs. Coal in bed.	Lbs. Iron on bed.
September 6, 1877.	2,400	7,200	2,400	7,200
First charge coal.....	400	3,600	400	3,600
Second ".....	250	3,600	250	3,600
Third ".....	400	3,600	400	3,600
Fourth ".....	400	3,600	400	3,600
Fifth ".....	400	3,600	400	3,600
Sixth ".....	400	3,600	400	3,600
Seventh ".....	400	3,600	400	3,600
Eighth ".....	400	3,600	400	3,600
Ninth ".....	100	1,000	100	1,000
Total coal used.....	5,550	Total iron melted.....	36,400	

The above statement does not represent the entire amount of iron melted by Rathbone, Sard & Co. in one week, but only the amount melted in one of their cupolas.

The New York State Interest Law.

The legal rate of interest in New York State on and after January 1 is changed from 7 to 6 per cent. Following is the new law:

Section 1. Section 1 of title 3, chapter 4 part 2 of the Revised Statutes, entitled "Of the Interest of Money," is hereby amended so as to read as follows: "Section 1. The rate of interest upon loans or forbearances of any money, goods or things in action shall be \$5 upon \$100 for one year, and after that rate for a greater or less sum or for longer or shorter time; but nothing herein contained shall be construed as in any way to affect any contract or obligation made before the passage of this act."

Considerable discussion has arisen as to whether the date of passage referred to in the law is the date when it takes effect (January 1, 1880) or the date of approval (June 20, 1879). The Attorney-General has given an opinion that the former is the date of passage and that legal contracts made before this date are exempt from its operation. The Albany Law Journal has taken issue with the Attorney-General, holding that no legal contract for more than 6 per cent. can be made after June 20, 1879, the writer of the article assuming that the passage of the act in June amounted only to ample notice that after January 1 the rate would be 6 per cent. and that all contracts made after such notice to extend beyond the coming date would be illegal. The Journal of Commerce recently combatted this theory as follows: "This assertion overlooks the fact that the exception clause in the law was wholly unnecessary as far as the rights of such contractors are concerned. This is provided for in the Constitution, and no act of the Legislature can violate it. A contract to pay interest at the rate of 7 per cent. for a given term of years was legal in this State, and so continues to be legal until there is a law to prohibit it. A law will go into operation on January 1 to prohibit it, but a notice of the fact that such a law will operate at such a date cannot abrogate a contract for a higher rate previously made according to the law now in operation, and extending by its terms into the future. Such contracts will bear 7 per cent. interest until they mature." The discussion of the question will probably never be closed until the courts have passed upon it.

A legal gentleman of high repute and an ex-judge has given it as his opinion that all contracts made before January 1, 1880, and by their terms bearing 7 per cent. interest, will continue at the same rate until the date of their maturity; that all contracts of this character, in which it is expressly stipulated that 7 per cent. interest shall be paid on the amount due until the principal is all returned, will also bear 7 per cent. interest up to the day of final payment, although the principal is already due and payable; that all contracts not originally subject to either of the conditions that would extend the 7 per cent. interest beyond January 1, may be brought within the exception and continued at the existing rate by indorsing upon them, duly executed, a new contract for a consideration either extending the limit of maturity to a future date, or providing that they shall bear 7 per cent. interest until wholly paid off and the obligation discharged. And that all other interest-bearing contracts, debts, obligations, advances made on open account, ledger balances and the like, will come under the operation of the new law, and bear only 6 per cent. interest after the 1st of January.

The following statistics will show the sentiments of all the other States and Territories, as expressed by their laws, in regard to money borrowing and lending. Of the entire number ten only have what may be called a "cast-iron interest law." These are Alabama, Connecticut, New Jersey, Delaware, Maryland, New Hampshire, Pennsylvania, Vermont, West Virginia and Colorado. In all the other States and Territories a higher rate of interest than that fixed by law may, under certain circumstances, be charged, as when the parties agree between themselves to the increased rate, either verbally or in writing. In some cases a limit to agreement is prescribed. In others there is no such limit. The rates in the above-mentioned "cast iron" States are as follows: Delaware, Maryland, New Hampshire, Pennsylvania, Vermont, Connecticut and New Jersey, 6 per cent.; Alabama, 8 per cent.; Colorado, 10 per cent. For the rest the law—which, as above shown, may easily be evaded—fixes the rates of interest as follows:

Six Per Cent.—Arkansas, District of Columbia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine (where the law allows parties to agree in writing to any rate), Massachusetts (where the law is the same as in Maine), Mississippi, Missouri, North Carolina, Ohio (where the law allows no higher than 8 per cent. under any circumstances), Rhode Island (same law as Maine and Massachusetts) and Tennessee.

Seven Per Cent.—Dakota, Georgia, Kansas, Michigan, Minnesota, South Carolina and Wisconsin. In Dakota, Georgia, Kansas and Minnesota parties may contract as high as 12 per cent. In Michigan and Wisconsin they may agree to 10 per cent. In South Carolina the usury laws are practically abolished and parties may agree to any rate, provided the agreement is in writing.

Eight Per Cent.—Florida and Texas. In both of these States, however, usury laws

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Melting Iron with Coal and Coke in Foundry Cupolas.

BY EDWARD KIRK.

I received several inquiries lately from foundry men who have been accustomed to melting with coal as to how many pounds of iron can be melted to the pound of coke, and as to how a cupola should be charged when melting with coke; and from foundry men who have been accustomed to melting with coke I have received the same inquiries about melting with coal. All this information, together with accounts of melting and descriptions of the methods of charging cupolas with coal and coke in various foundries, will be found in my work, "The Founding of Metals," and below I give an accurate account of a week's melting done in two of our leading stove manufacturers. In each of the statements is given the amount of fuel in the bed, the amount of fuel in each charge, and the amount of iron on the bed and on each charge of fuel. The cupola used by the Excelsior Manufacturing Company is a round one, with a shell 6 feet 2 inches in diameter. It is lined with 8-inch brick to about 12 inches above the tuyeres, and with 6-inch brick from there up. Seventy-two small round tuyeres arranged in four superposed rows are used in this cupola, and are supplied with air from an air chamber surrounding the cupola. The cupola used by Rathbone, Sard & Co. is a round one, with a shell 6 feet in diameter, lined with 6-inch brick from the bottom up. Eight oval tuyeres arranged at equal distances apart are employed in this cupola.

Melting done with coke at the foundry of the Excelsior Manufacturing Company, at St. Louis, Mo., for the week ending August 25, 1877. Table showing the amount of coke required to melt iron and their mode of charging the cupola when melting with coke. In these heats 40 pounds of coke are counted to the bushel and the coke was the best Connellsville.

Date.	No. of charges.	Bush Coke to charge.	Total Bushels Coke.	Lbs. Iron to charge.	Total Lbs. Iron.
1877.					
Aug. 20.....	1	45	45	3,000	3,000
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	4	7	28	3,050	12,200
	17	—	149	—	51,200
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	3	7	21	2,900	17,400
	19	—	163	—	55,400
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	4	7	28	3,000	12,000
	3	6	18	3,000	9,000
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	17	—	149	—	58,500

NOTE.—The first charge in each table is the bed charge.

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August 31, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

Date.	No. of charges.	Bush Coal to charge.	Total Bushels Coal.	Lbs. Iron to charge.	Total Lbs. Iron.
September 1, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

Date.	No. of charges.	Bush Coal to charge.	Total Bushels Coal.	Lbs. Iron to charge.	Total Lbs. Iron.
September 3, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

Date.	No. of charges.	Bush Coal to charge.	Total Bushels Coal.	Lbs. Iron to charge.	Total Lbs. Iron.
September 5, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

Date.	No. of charges.	Bush Coal to charge.	Total Bushels Coal.	Lbs. Iron to charge.	Total Lbs. Iron.
September 5, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

* Published by David Williams, 83 Reade Street, New York. Price \$2.50.

Date.	No. of charges.	Bush Coal to charge.	Total Bushels Coal.	Lbs. Iron to charge.	Total Lbs. Iron.
September 6, 1877.					
Coal in bed.....	1	45	45	3,000	3,000
First charge coal.....	5	6	30	3,000	15,000
Second ".....	4	7	28	3,000	12,000
Third ".....	4	6	24	3,000	9,000
Fourth ".....	4	7	28	3,000	12,000
Fifth ".....	4	6	24	3,000	9,000
Sixth ".....	4	7	28	3,000	12,000
Seventh ".....	4	6	24	3,000	9,000
Eighth ".....	4	7	28	3,375	13,500
Ninth ".....	1	10	10	4,300	4,300
Total coal used.....	55	—	550	—	37,000
Total iron melted.....	—	—	—	37,000	—

The above statement does not represent the entire amount of iron melted by Rathbone, Sard & Co. in one week, but only the amount melted in one of their cupolas.

The New York State Interest Law.

The legal rate of interest in New York State on and after January 1 is changed from 7 to 6 per cent. Following is the new law:

Section 1. Section 1 of title 3, chapter 4 part 2 of the Revised Statutes, entitled "Of the Interest of Money," is hereby amended so as to read as follows: "Section 1. The rate of interest upon loans or forbearances of any money, goods or things in action shall be \$6 upon \$100 for one year, and after that rate for a greater or less sum or for longer or shorter time; but nothing herein contained shall be construed as in any way to affect any contract or obligation made before the passage of this act."

Considerable discussion has arisen as to whether the date of passage referred to in the law is the date when it takes effect (January 1, 1880) or the date of approval (June 20, 1879). The Attorney-General has given an opinion that the former is the date of passage and that legal contracts made before this date are exempt from its operation. The Albany Law Journal has taken issue with the Attorney-General, holding that no legal contract for more than 6 per cent. can be made after June 20, 1879, the writer of the article assuming that the passage of the act in June amounted only to ample notice that after January 1 the rate would be 6 per cent, and that all contracts made after such notice to extend beyond the coming date would be illegal. The Journal of Commerce recently combatted this theory as follows: "This assertion overlooks the fact that the exception clause in the law was wholly unnecessary as far as the rights of such contractors are concerned. This is provided for in the Constitution, and no act of the Legislature can violate it. A contract to pay interest at the rate of 7 per cent. for a given term of years was legal in this State, and so continues to be legal until there is a law to prohibit it. A law will go into operation on January 1 to prohibit it, but a notice of the fact that such a law will operate at such a date cannot abrogate a contract for a higher rate previously made according to the law now in operation, and extending by its terms into the future. Such contracts will bear 7 per cent. interest until they mature." The discussion of the question will probably never be closed until the courts have passed upon it.

A legal gentleman of high repute and an ex-judge has given it as his opinion that all contracts made before January 1, 1880, and by their terms bearing 7 per cent. interest, will continue at the same rate until the date of their maturity; that all contracts of this character, in which it is expressly stipulated that 7 per cent. interest shall be paid on the amount due until the principal is all returned, will also bear 7 per cent. interest up to the day of final payment, although the principal is already due and payable; that all contracts not originally subject to either of the conditions that would extend the 7 per cent. interest beyond January 1, may be brought within the exception and continued at the existing rate by indorsing upon them, duly executed, a new contract for a consideration either extending the limit of maturity to a future date, or providing that they shall bear 7 per cent. interest until wholly paid off and the obligation discharged. And that all other interest-bearing contracts, debts, obligations, advances made on open account, ledger balances and the like, will come under the operation of the new law, and bear only 6 per cent. interest after the 1st of January.

The following statistics will show the sentiments of all the other States and Territories, as expressed by their laws, in regard to money borrowing and lending. Of the entire number ten only have what may be called a "cast iron interest law." These are Alabama, Connecticut, New Jersey, Delaware, Maryland, New Hampshire, Pennsylvania, Vermont, West Virginia and Colorado. In all the other States and Territories a higher rate of interest than that fixed by law may, under certain circumstances, be charged, as when the parties agree between themselves to the increased rate, either verbally or in writing. In some cases a limit to agreement is prescribed. In others there is no such limit. The rates in the above-mentioned "cast iron" States are as follows: Delaware, Maryland, New Hampshire, Pennsylvania, Vermont, West Virginia and Colorado, 6 per cent.; Connecticut and New Jersey, 7 per cent.; Alabama, 8 per cent.; Colorado, 10 per cent. For the rest the law—which, as above shown, may easily be evaded—fixes the rates of interest as follows:

Six Per Cent.—Arkansas, District of Columbia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine (where the law allows parties to agree in writing to any rate), Massachusetts (where the law is the same as in Maine), Mississippi, Missouri, North Carolina, Ohio (where the law allows no higher than 8 per cent. under any circumstances), Rhode Island (same law as Maine and Massachusetts) and Tennessee.

Seven Per Cent.—Dakota, Georgia, Kansas, Michigan, Minnesota, South Carolina and Wisconsin. In Dakota, Georgia, Kansas and Minnesota parties may contract as high as 12 per cent. In Michigan and Wisconsin they may agree to 10 per cent. In South Carolina the usury laws are practically abolished and parties may agree to any rate, provided the agreement is in writing.

Eight Per Cent.—Florida and Texas. In both of these States, however, usury laws

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[See advertisement in The Iron Age of January 1, 1880.]
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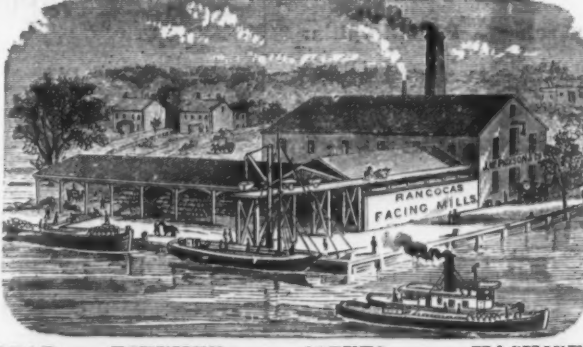
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currence..... 1.50
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depend upon circumstances.
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insoluble Silicious Matter in a Limestone... 10.00
or each additional constituent..... 2.00
or the per cent. of Water, Volatile Combust-
ible Matter, fixed Carbon, and Ash in Coal, 12.50
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respond with those for the constituents of an ore.
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have been altogether repealed, so that there
is nothing to prevent almost any rate of in-
terest from being, at least, demanded.
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may agree to any rate), Idaho Territory
(where 2 per cent. a month is lawful if
agreed upon), Nebraska, Nevada, Oregon,
Utah and Washington Territories.
Twelve Per Cent.—Wyoming Territory,
which, notwithstanding this generous legal
margin of profit, permits any rate to be
asked by the lender, if the borrower pre-
viously consents to it in writing.
Montana alone has never fixed any legal
rate of interest. Borrowers and lenders in
that picturesque country make any sort of
an off-hand "swap" that suits them.

**The Effect of Reducing Agents upon
Copper Alloys.**

We had the pleasure quite recently to
publish in *The Iron Age* full abstracts of
Prof. Thurston's experiments with copper
and tin alloys. These, it will be remem-
bered, were made to ascertain the me-
chanical properties of the alloys of the
metals in varying proportions, no attempt
having been made to investigate the effect
of improved methods of casting, or of the
addition of various substances destined to
correct defects and insure sound castings.
One of the principal dangers to be guarded
against in casting copper and its alloys is the
oxidation of the metal and the absorption
of the oxide formed, and it has been a great
step toward improvement that metallurgists
have learned to appreciate the value of cer-
tain substances, notably phosphorus and
manganese, as reducing agents. The suc-
cessful manufacture and the high quality of
the alloys known as phosphor-bronze and
manganese bronze, are fully appreciated and
have been repeatedly referred to in the
columns of *The Iron Age*. It is much to be
regretted that the short life of the United
States Test Board has, for the time being,
cut off all hope of a termination of the ex-
periments so auspiciously begun by Prof.
Thurston. We must for the present rest
content with watching progress abroad, and
it is with this object that we present the
following abstract of a series of highly in-
teresting researches made recently by M.
Michel Lévytsky, of Toul, Russia, published
in the *Revue Universelle des Mines de Liège*.

M. Lévytsky adds to the two elements al-
ready mentioned (phosphorus and manga-
nese) a third, zinc, which to a certain de-
gree acts similarly. The reducing power of
these substances is approximately pro-
portionate as follows: 2500 for phosphorus,
2460 for zinc and 2092 for manganese, the
latter having besides the advantage of re-
maining fluid at a temperature approaching
that of copper, while the two others, volatil-
izing more readily, cannot be added as
easily, the introduction of phosphorus even
causing dangerous explosions. With the
object of studying the effects of these sub-
stances upon the alloys of copper, M. Lévy-
tsky carefully chose the same materials and
processes throughout his experiments, and
while the lack of proper apparatus prevented
as thorough an investigation as was desired,
notably as regards mechanical tests, they
possess much interest, as they are in many
respects the first of the kind presented.

The following analyses will show the na-
ture of the materials used:

"DEMIDOFF" COPPER. (Average of ten analyses)			
Copper.....	99.9106	Arsenic.....	0.0020
Iron.....	0.0034	Oxygen.....	0.0005
Silver.....	0.0032	Residue & losses	0.0442
Antimony.....	0.0042	Specific gravity.	8.762
Tin.....	0.0035		

EISEN SPIEGELEISEN.			
Iron.....	70.541	Carbon.....	4.917
Manganese.....	18.330	Phosphorus.....	0.012
Silicon.....	0.092		

TERRENOIRE FERROMANGANESE.			
Iron.....	42.983	Carbon.....	6.328
Manganese.....	52.123	Phosphorus.....	0.031
Silicon.....	0.075		

The zinc used was best Silesia (specific
gravity, 7.159), and the tin chosen was
Bohemian (specific gravity, 7.283). The
Mannes cupromanganese contained 25 per
cent. manganese, the Lavois phosphide of
copper held 6.560 per cent. and 7.216 per cent.
of phosphorus, respectively, and a lot of phos-
phide of copper made according to the
Sidot process, 7.529 per cent. of phosphorus.
The method employed by Sidot is the fol-
lowing:

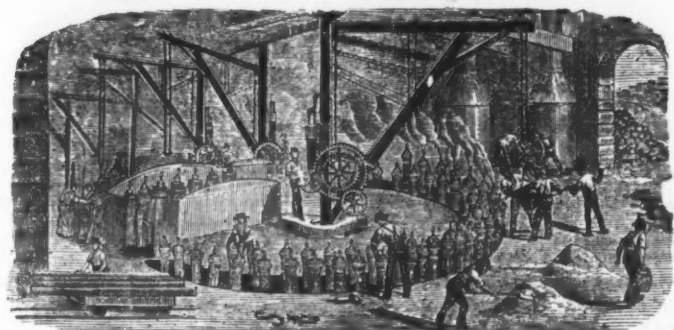
Phosphorus is made to act upon a heated
concentrated solution of sulphide of copper.
After one hour's boiling the solution loses
its color if there is phosphorus in excess. In
this case the liquid is either decanted and re-
placed by a fresh solution of the copper
salt, or crystals of sulphate of copper are
added to the boiling liquor until it regains
its color. The solution is then decanted,
and the residuum is washed until no trace of
acid can be detected in the water. The pre-
cipitate is spread on cloth and dried over at
a low temperature. By this process many
pounds of black phosphide of copper may
be made in a few hours. The product
should be black; it must not, as sometimes
is the case, be greenish. The phosphide
thus obtained is not decomposed either by
exposure to the air or by contact with
water. It melts at a red heat, losing about
10 per cent. of its weight. A grayish-white
metallic button is the result, so brittle that
it may be reduced to powder under a ham-
mer; but if the temperature is raised con-
siderably a part of the phosphorus is ex-
pelled, and after cooling a white mass is ob-
tained which is as hard as steel. The black
phosphide of copper possesses the valuable
property of permitting the easy addition
of known quantities of phosphorus to metals,
whose qualities, as is well known, are there-
by materially improved.

The first series of experiments were made
with alloys of copper and zinc in varying
proportions, each alloy being first melted
alone and then receiving additions of cupro-
manganese and spiegeleisen. The effect of
both is striking, not only as regards the im-
provement in tensile strength, but also ducti-
lity, the spiegeleisen (the third in each group),
notably, being particularly effective. The
ductility, malleability and hardness are un-

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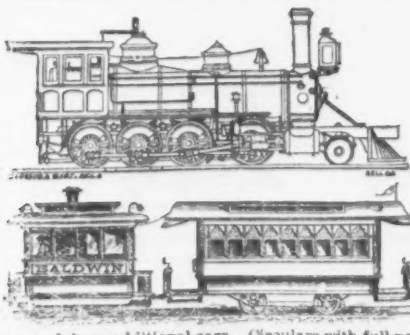
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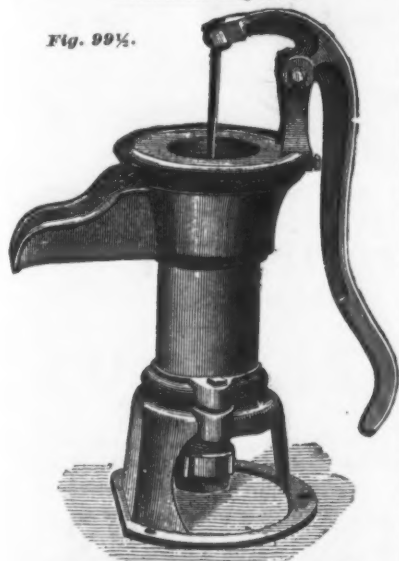
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one, neat in appearance, easy to put on, and not
liable to get out of order. The springs are made from
wire made expressly for us, and for this particular
purpose, with the view of great elasticity, durability
and power. They produce a continuous pressure
from the point where the door is wide open until it is
closed, and then hold it perfectly in position. It has
a solid pin in connection with short hollow ones,
causing little or no friction, the whole power of the
spring being exerted in swinging the door. It is Fast
Joint, and can be used for either right or left hand,
allowing the dealer to carry less stock, and the builder
will never get the wrong hand.

157 Fine Castings a Specialty.

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Heaton & Denckla, 507 Com-
merce St., Phila. (Butts).

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Price List.



CUT TACKS, SHOE NAILS, WIRE NAILS,

Pat. Brads, Finishing Nails, Clout Nails, Trunk Nails, Hungarian Nails,

Cigar-Box Nails, Basket Nails, 2d and 3d Fine Nails.

Carpet Tacks, Upholsterers' Tacks, Gimp and Lace Tacks,

Brush Tacks, Copper and Brass Tacks,

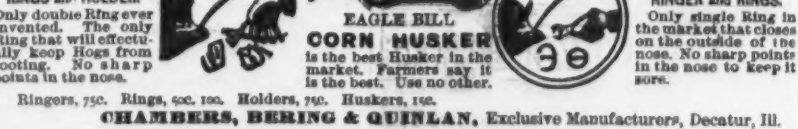
BRASS AND IRON ESCUTCHEON PINS, &c., &c.,

MANUFACTURED BY

DUNBAR, HOBART & WHIDDEN, So. Abington Station, Mass.

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Particular attention given to orders for EXPORT.



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HOG RINGER

RINGS and HOLDER.

Only double Ring ever
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Ring that will effec-
tually keep Hogs from
rooting. No sharp
points in the nose.

Ringers, 75c. Rings, 50c. 100. Holders, 75c.

CHAMBERS, BERRING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

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CORN HUSKER

is the best Husker in the
market. Farmers say it
is the best. Use no other.

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Only single Ring in
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on the outside of the
nose. No sharp points
in the nose to keep it
soft.

Ringers, 75c. Rings, 50c. 100. Holders, 75c.

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fortunately given according to the order
introduced by Mallet in his researches on
the alloys of copper. They are not refera-
ble to any standard or scale. The only
means of comparison is that afforded by the
valuable table and diagram published by
Prof. Thurston in his Report on Copper Tin
Alloys, Table XX, page 390, and Plate 15.
M. Lévitzy has found it necessary to in-
crease the range of the order of ductility
and other properties. Mallet represents the
ductility of the brittle metals at 0. The
figures of relative hardness, malleability and
ductility are on a scale in which the figure 1
represents the maximum and 16 the mini-
mum of the property. It will be seen from
the tables that an addition of cupromanga-
nese to alloys of copper and zinc increases
the tensile strength and the malleability,
while in most cases it decreases the hard-
ness and ductility. The action of spiegel-
eisen, while it is usually less pronounced,
is similar with the exception of the hard-
ness.

Theoretical com- position.		Actual composition.	
Copper.	Zinc.	Copper.	Zinc.
100	0	100	0
90	10	90	10
80	20	80	20
70	30	70	30
60	40	60	40
50	50	50	50
40	60	40	60
30	70	30	70
20	80	20	80
10	90	10	90
0	100	0	100

* Addition cupromanganese.
** Addition spiegel-eisen.

M. Lévitzy then gives in tabular form
the results of a series of experiments with
gun and bell bronze, including in his tests
the effects both of casting into the clay and
cast-iron molds and of cold hammering. His
figures clearly show the benefits to be de-
rived by casting into iron molds and cold
hammering. We shall, in the following,
give only the results of casting into iron
molds, without the subsequent cold working,
and would add that, as he gives only one
analysis in each class, those presented in the
following tables are not always made of the
identical metal, but, as in all cases the ma-
terials were composed of a mixture of the
same materials and underwent the same
processes, the differences can only be nomi-
nally small. As before, tests were first made
with the tin and copper alloyed without ad-
ditions, and then with the reducing agents,
thus affording means for direct comparison.

Theoretical composition.		Chemical composition.	
Copper.	Tin.	Copper.	Tin.
100	0	100	0
90	10	90	10
80	20	80	20
70	30	70	30
60	40	60	40
50	50	50	50
40	60	40	60
30	70	30	70
20	80	20	80
10	90	10	90
0	100	0	100

From this table it is clearly evident how
very beneficial is the effect of the addition
of reducing agents, especially upon alloys
high in copper, both upon tensile strength
and ductility. Ferromanganese appears to
be the weakest reducing agent in some
cases, while phosphide of copper and cupro-
manganese both produce remarkable results
in others. The density of the alloy is in-
creased in all cases, and the chemical com-
position shows that the amounts of the ele-
ments added to effect deoxidation remaining
in the alloy are comparatively small, by far
the greater bulk of them being carried into
the slag. This may, to a certain extent, be
regarded as indicating that the quantities
chosen are correct.
M. Lévitzy gives also the results of some
experiments with alloys of 18 and 20 per
cent. of tin and various additions, but as
none but rough mechanical tests are ap-
pended, we pass by them to give the follow-
ing data concerning the use chiefly of cupro-
manganese. Here also hardness, ductility
and malleability are given according to the
Mallet scale.

Theoretical com- position.		Chemical composition.	
Copper.	Zinc.	Copper.	Zinc.
100	0	100	0
90	10	90	10
80	20	80	20
70	30	70	30
60	40	60	40
50	50	50	50
40	60	40	60
30	70	30	70
20	80	20	80
10	90	10	90
0	100	0	100

These results are of value, as indicating
that large amounts of manganese render the
alloys hard, brittle, and decrease their mal-
leability and tensile strength to an alarming
degree. They prove, also, that any excessive
addition of ferromanganese to zinc and cop-
per alloys acts in a very injurious manner,
and forcibly illustrate the dangers which
an excess of these reducing agents entails.

M. Lévitzy considers cupromanganese
the most advantageous, as it does not contain
any volatile element, the presence of which
in the phosphides renders them dangerous,
and makes a precisely correct addition a
somewhat delicate matter. The alloys of
iron and manganese, such as spiegel-eisen
and ferromanganese, possess the drawback
that any considerable amount of iron intro-
duced into the purified product renders it
liable to unsoundness. In general, it may
be stated that the use of a reducing agent is
indispensable whenever the object to be
manufactured is so large that a separation
into alloys of different degrees of fusibility
must be feared, or whenever parts of ma-
chinery of great tenacity are required, or
whenever old metal is to be recast. The
circumstances in each case must decide the
choice of the reducing agent, the use of
which, M. Lévitzy hopes, will considerably
increase the sphere of usefulness of the cop-
per alloys.

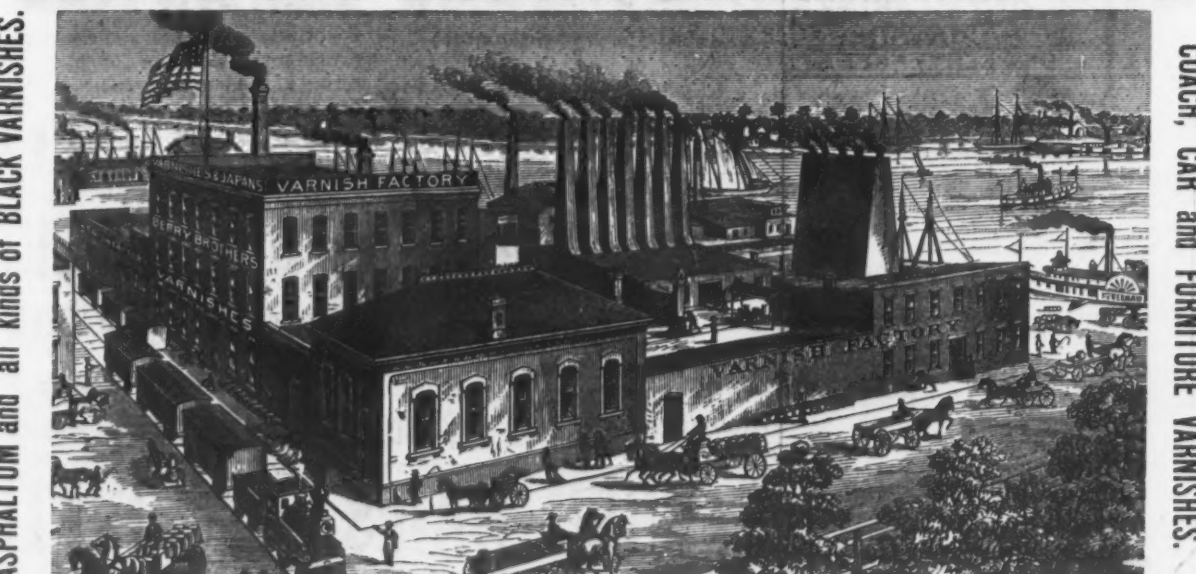
Japanese Tariff Revision.—The Jap-
anese proposals for treaty revision which
have so frequently been revived and aban-
doned within the last few days as to throw
general doubt over the government's in-
tentions, are now brought forward with
fresh signs of activity. The administrative
vigor shown in the foreign department since
the accession of the new minister, Inouye
Kaoru, inspires the hope of definite action
at last. More Arinori, Envoy to England,
carries the Japanese plan of rearrangement,
for the inspection of European Cabinets, as
before announced. There is no suggestion
of a change in the present extra territorial
conditions. The exclusive right to the coast
trade is positively demanded. An energetic
minority in the ministry urged the im-
mediate resumption of complete and entire
control over the customs tariff. This was
opposed by the majority, under the appre-
hension that a forcible opposition by Great
Britain and other commercial powers would
compromise the scheme if it was adopted.
The Japanese will agree to a further tariff
treaty for a fixed term of years, after which
all power over duties will revert to Japan.
Meanwhile the tariff will be raised to an
average equivalent of 15 per cent. ad valo-
rem; the lowest import duty is 5 per cent.,
and the highest 30. The existing rate is 5
per cent. ad valorem. There is considerable
irritation among resident Americans over
the obvious discrimination favoring Eng-
lish imports. This discrimination is felt to
be ungracious, in view of the friendship
often manifested toward Japan by the United
States.

Production of the Krupp Works.—
The results just announced of the produc-
tion of the Krupp Works for the past year
show a considerable increase over the pre-
ceding one. The quantity of iron and steel
turned out are stated to be as follows:

	1878.—Tons.	1877.—Tons.
Wrought and Bar Iron	12,750	10,411
Bessemer Steel	98,120	94,754
Martin Steel	19,350	14,454
Tiegel Cast	10,354	9,484
Cast Iron	7,193	6,798

This quantity was used in the manufac-
ture of axles, wheels, tires, springs, rails,
sheets, columns, tool steel, guns, projectiles,
&c.
The *Journal de Liège* publishes the follow-
ing remarkable statement as to experiments
being made in the Hörde Works in Germany.
Instead of blowing gray pig rich in silicon,
it was found possible to treat white pig, it
contained a sufficient amount of phospho-
rus. Far from being afraid of phosphorus,
some 2 per cent. of that body is required in
the pig, in order to give a sufficient degree
of heat to the bath. Hörde has begun to
make ferrophosphide with 20 per cent. of
phosphorus, and will presently make this al-
loy to contain 50 per cent. phosphorus. This
will be sold to mix with white pig, since the
crude metal must contain phosphorus or sil-
icon enough to carry up the bath to the heat
required. At Hörde all sorts of pig, even
cinder pig, with 3 per cent. phosphorus and
0.5 per cent. silicon, were treated. The
presence of 0.2 to 0.3 per cent. sulphur
could also, it was found, be tolerated. The
steel made contained under 0.1 phosphorus
and no silicon. On December 1 experiments
of a character recognized as decisive were
carried out before a party of ironmasters
assembled to watch the operations.

BLACK and BROWN BAKING JAPANS.



BERRY BROTHERS, Varnish Manufacturers, Detroit, Mich.
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West Lombard St.; PHILADELPHIA, 57 North Front St.; BOSTON, 141 Milk St.; NEW YORK, 279 Broadway.

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Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
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89 Chambers and 71 Reade Streets, N. Y.

Paris, 1878.


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Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

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Phoenix Superior Cast-Steel Auger Bits,
Screw-Drivers Bits,

Taper Pod Gimlets,
Taper Pod Gimlet Bits,
Countersink Gimlet Bits,
Long Millwright Solid Cast-Steel Augers,
Long Raftering Solid Cast-Steel Augers,
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And all kinds of Machine Bits made to order.

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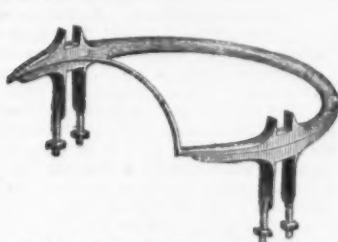
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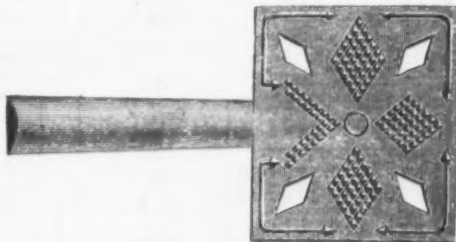
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Wilson Mfg. Co., Bits, Blind Hinges, Gate Hinges, Thumb Latenes, Axle Pulleys, Nash Bolts,
Clark & Co., Brackets, Barn Door Hangers, Cylinder Heads, Lamb's Tea-Pot Handles, Coat and Hat Hooks, &c.
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T. & W., Hand-Forged Screw Drivers,
Nashua Lock Co., Locks, Knobs, &c.
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Hull's, Patent Nut Cracker,

DEPOT FOR

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Holden's Files,
Woolson's Wood Mouse Traps,
Bent's & Call's Patent Wrenches, Calipers, Dividers,
Clark's Axes and Hatchets,
Lincoln's Molasses Gates,
Aiken's Saw Sets and Awls and Tools,
Leach's Saw Sets,
Stillman's Saw Sets,
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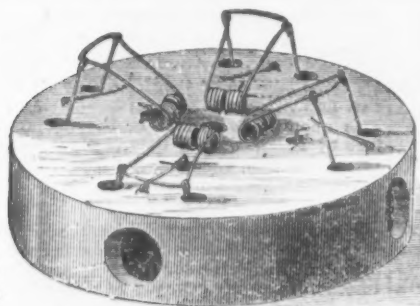
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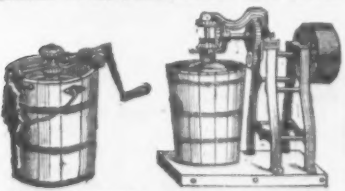
Unionville, Ct., U. S. A.,

Manufacturers of

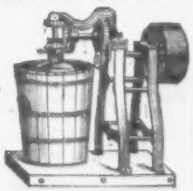
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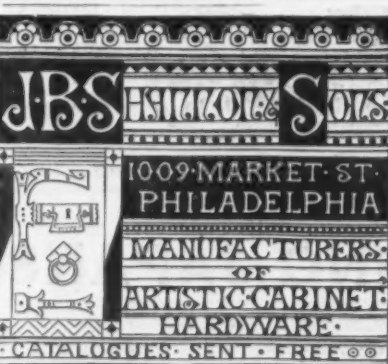
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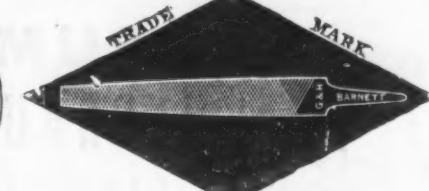
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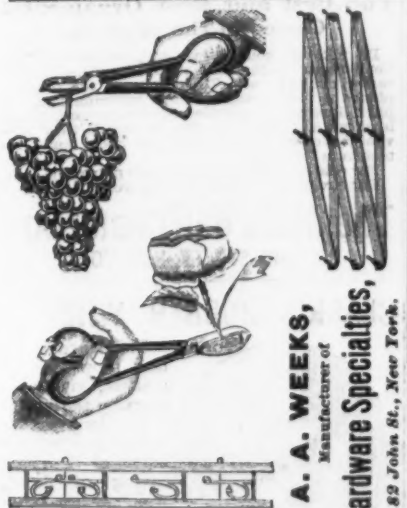
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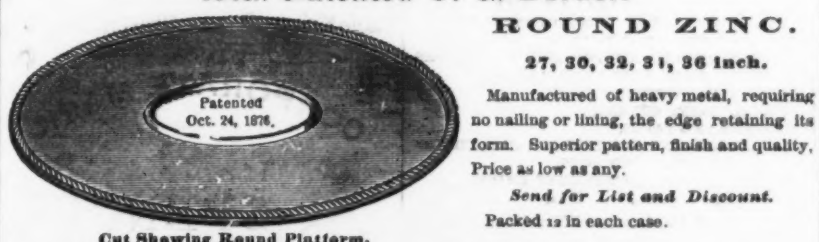
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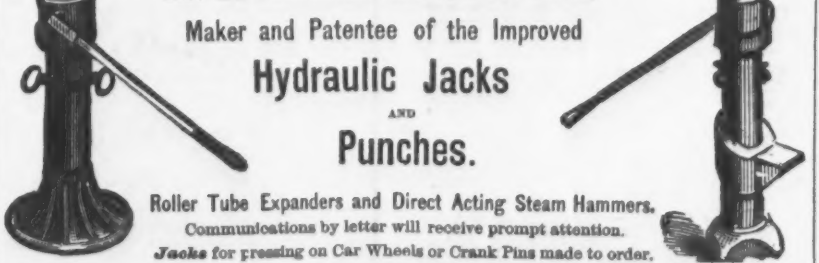
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It is the only Hot Forged and Hammer Pointed Horse Shoe Nail, made by machinery, in the World.
Some other manufacturers claim to make a hot forged Nail, but you will observe on all such a sheared edge near the point.
THE PUTNAM NAIL CO., Boston.
P. O. Address, Neponset, Mass., U. S. A.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The manufacture of stoves and ranges has increased to a remarkable extent in Taunton within a few years. The city now contains eight stove and range foundries, and it is estimated that over 15,000 stoves have been made the past year and sold throughout the country.

It is proposed to form a stock company at Brockton, with a capital of \$25,000, for the manufacture of clothes wringers.

NEW YORK.

The Albany and Rensselaer Iron and Steel Company are about to increase the extent of their operations at Troy, by beginning the manufacture of agricultural steel, which is used in the fabrication of farming implements. It is estimated that 20,000 tons of this material are used annually for the above purpose. The manufacture of this kind of steel was determined upon several months ago, and the construction and placing of machinery have already been begun. It was expected that arrangements would be completed by January 1st, when 60 hands were to be employed in addition to the present force of 2200 men.

NEW JERSEY.

A promising field of enterprise is opened in various parts of South America in providing small portable houses for railroad laborers, or others engaged on public works who have no certain dwelling place. Mr. A. G. Plume, of Newark, N. J., has received a letter from an engineer on a railroad in Brazil, stating that he desires to contract for a large number of houses of that description. They must be built in such a manner that they can be taken down or put up at short notice. It will be remembered that Col. Darrow, of Paterson, not long ago had a large contract in Venezuela for portable houses.

At Phillipsburg, the largest iron manufacturing town in Western New Jersey, fully 1000 men find employment in the mills alone. The Warren Foundry, which six months ago was running on short time with not 100 men at work, is now employing over 400 men, besides having introduced new machinery, which does away with the employment of many hands. The Andover Furnace, at Phillipsburg, furnishes employment to about 200 men. There are three stacks working, and a new one ready to be fired. This furnace has raised the wages of all its men.

DELAWARE.

The Jackson & Sharp Co., of Wilmington, are running about 700 men in their various departments, chiefly in car building. They have had several South American orders this year, and recently one from Brazil. Bowers, Dure & Co., Wilmington, have had an active trade during 1879, and expect to increase their working force by taking on upward of 100 additional hands toward spring. They have just completed an order for freight and passenger cars for the Columbus and Sand Creek Railway, another for the Shenandoah Valley, and one for the New Jersey Central.

PENNSYLVANIA.

Stokes & Parrish, of Philadelphia, report an active demand for their special machinery, including furnace hoists, belt hoists and hydraulic elevators. During the past few months they have completed a hydraulic passenger elevator for the American Hotel, and several hydraulic freight hoists for leading firms in the city. They have also built a number of double-drum wharf hoists for the United States government, Atlantic Refining Co., and others. They are now building one hydraulic hoist for Detroit, two for Cincinnati and one for Baltimore. Schleicher, Schumm & Co., of Philadelphia, have sold 70 odd "Otto" silent gas engines within the past six months, and have now more orders on their books than ever. They are increasing their facilities for manufacturing, and expect to be able to meet the demand promptly.

Lovegrove & Co. shipped a number of their small power engines during the year to the following countries: Russia, Greece, Italy, Spain, Japan, East Indies and Australia. The Reading Iron Works are now employing 3000 men in their various departments, and are pushed to keep pace with orders. Notwithstanding the recent extensive additions to their premises, they find their facilities inadequate to their requirements.

A furnace company has been organized under the name of the Rockland Furnace Company, for the purpose of engaging in the manufacture of iron at the Rockland Furnace, in Rockland township, Berks county. The officers are as follows: President, Comly B. Shoemaker; Secretary and Treasurer, Joseph L. Bailey; General Manager, Benjamin F. Morret. The capital stock is \$10,000, divided into 320 shares of \$50 each, all paid up.

Work has commenced this week at the Delaware Rolling Mill in Easton.

The blast furnace in Erie, owned by Rawle, Noble & Co., was built in 1869, and was run until 1875, when it was put out of blast. The revival in the fall of 1879 determined its owners to put it in operation again. It has been enlarged and provided with a closed top. It will be run on Connellsville coke and black coal from Shenango Valley, Lake Superior and Cornwall ore.

The work of repairing the Swedes Furnace, Montgomery County, is being rapidly pushed, a force of 60 men being employed. It is the intention to rebuild both stacks and to get into operation as soon as possible.

No. 1 Westerman Furnace, Sharon, was in blast at the beginning of the year, and No. 2 was to blow immediately.

One of the Mount Hickory Furnaces, Sharpesville, blew in on the 4th, the other is out of blast.

Messrs. Broomall, Miles & Co., Westchester, manufacturers of portable and stationary engines and mill and factory gearing, are building a new foundry 35 x 50. They also manufacture the Westchester pruning shears.

Blast furnace No. 3, Birdsboro', of Messrs. E. & G. Brooke, has started. The furnace will be run upon foundry iron, for which grade there is a great demand.

The warehouse, machine shop and part of the foundry hardware works of Rick Bros.,

at Reading, were burned last week. Loss, \$45,000; insurance on the buildings, \$25,000. Their facilities for turning out large quantities of goods promptly are somewhat impaired, but financially they are not damaged a particle. Their principal machine shop, foundry, engines and boiler are in good condition. Their main loss will be a delay in filling orders. This, however, will be only for a short time.

The large freight locomotive that was shipped to Paris over a year ago, is back again in the P. & R. shops, Reading, where the different parts are being put together again. It will be placed on the main road of the company.

The sales of the Gautier Steel Company, Limited, Johnstown, for the past six months show an increase of \$700,000 over the corresponding period of the preceding year.

The Richmond Furnace, at Richmond, Franklin County, and also the excellent hematite ore mines, have been leased by Robert T. Ryan & Co. The furnace is expected to be in blast about January 10th. It has a capacity of about 80 tons per week, and will be run principally on Gray Forge iron. J. O. Richardson, of Philadelphia, has been appointed sales agent for the iron and ore.

Mr. Thos. H. Lyman, Son of Mr. C. A. Lyman, of Philadelphia, has been admitted to an interest in his father's Iron Commission and Brokerage Business, which will hereafter be conducted under the firm name of Lyman & Co.

PITTSBURGH AND VICINITY.

The Beaver Falls Iron Works, the only iron rolling mill in this thriving little town, will be in full blast this week with plenty of orders and a fine prospect. This is a new concern, and the iron made will be mainly billets, blooms and bars for converting and melting.

Shoenberger & Co. have leased the idle puddling furnaces of Hussey, Howe & Co., in order to make muck iron with which to keep their mill factory running steadily.

Carnegie Bros. & Co. are building six new puddling furnaces and two Siemens-Martin furnaces, at their works. Four new puddling furnaces are being built at Brown's mill.

Owing to the press of orders the Pittsburgh mills will not stop as long as usual for the customary repairs.

Over 5,000,000 bushels of coal went down the Ohio on the Christmas rise.

The West Point Boiler Works of R. Monroe were partially destroyed by fire on the evening of the 2d. The loss was some \$6000. The most valuable part of the works, consisting of the extensive machine shops, containing machinery worth about \$20,000, was fortunately saved, and the works resumed operations the next morning as if no fire had occurred. The saving of the working machinery, which is not at all damaged, is a lucky circumstance for the proprietor, as he has large orders to fill and will be able to proceed without interruption. Mr. Monroe has purchased the Smith Pipe Works, at Twenty-third and Smallman streets, and intends to remove his works out there in a short time.

The hoisting house and the ironwork of the blast furnace at Kittanning are nearly completed.

Sunday afternoon, the 28th ult., at 1 o'clock all the trusses of the converting mill of the Edgar Thompson Steel Works gave way, and the roof fell to the ground. As is customary, the works stop for two or three weeks during the holidays for repairs, and it was proposed during the present idleness of the mills to have a new set of trusses placed in the converting department, as those in present use were not strong enough to bear up the iron roof and support four cranes and other machinery. The Keystone Bridge Company had the contract of replacing the old roof with new trusses of about four times the weight and strength of the former ones. They had been working for the past week, and had one of the trusses swung from the walls, and were preparing to take down the old one when the entire roof, 90x90 feet, came down. Two cranes were damaged to the extent of some \$500 to \$1000, but no delay in the resumption of work in the converting department will occur. Five men were injured, but none seriously. Strict orders had been given that no one should remain there while the men were at work above.

The report that Smith, Sutton & Co. had stopped for two weeks to put in a bed-plate to their engine is not correct. The bed-plate to their large sheet mill is broken, and when the new one is ready two trains will be stopped for a few days. The work will probably be done the present week.

Brown & Co. are building four new puddling furnaces.

MARYLAND.

The Cumberland Coal and Iron Company, whose furnace is at Frostburg, have determined to put their works into operation without delay. They have been idle for several years. Mr. E. L. Brown has been elected president, and Mr. J. Richards continues as secretary of the company.—Bulletin of Iron and Steel Association.

OHIO.

There are 46 rolling mills in the State, 32 of which are in operation.

The rolling mill at Newark has been abandoned and the machinery removed. Part of it will be erected in Pittsburgh.

At the Lawrence Mill, Ironton, large amounts of chain iron are being manufactured.

The Washington Furnace continues successfully on raw bituminous coal, making a very fair grade of iron. They are paying 85 cents per ton for mining coal.

The Monroe Furnace will make a 4000-ton blast next year.

The capacity of the iron furnaces in blast in this State on the 1st of October last was, according to the labor statistics report, 1937 tons daily, as follows: Athens County, 25 tons; Belmont County, 81; Columbiana, 160; Cuyahoga, 183; Hocking, 90; Jackson, 137; Jefferson, 125; Lawrence, 217; Mahoning, 460; Muskingum, 40; Perry, 145; Scioto, 29; Trumbull, 215; Tuscarawas, 40.

The Charcoal Iron Company's furnaces, Buckhorn and Howard, were sold by the Sheriff, the former for \$55,100 and the lat-

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FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave patent
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
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Agents for the BENGAL RAZORS.
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BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application.
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N.Y.
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AMERICAN TABLE
CUTLERY &c.

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Send for list of other patterns.

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Every machine guaranteed or no sale.
Is now improved by lever attach-
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lever, for, if preferred, crank can be used.
The trade are invited to write for terms,
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CHAMPION
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BALL'S PAT. SOLID STEEL SHEEP SHEARS.
These shears are unsurpassed for cheapness, dura-
bility and utility. They are made of one solid piece
of steel from point to point, and cannot be broken in
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GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
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CANASTOTA KNIFE CO.'S POCKET KNIVES.
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One Dozen

In a box.

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Fulcrum 14 inch

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Fulcrum length-

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way, thus add-

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Simple, Cheap,

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Durable, short hitch,

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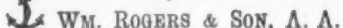
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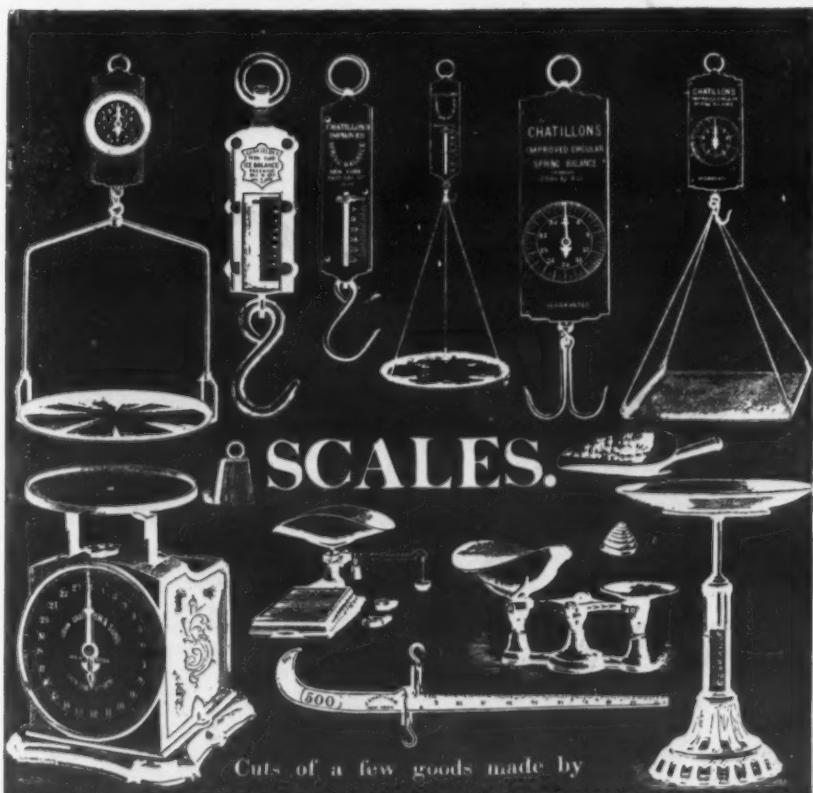


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We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces. Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., \$250. We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others.

INFRINGEMENTS. We call attention to infringers of the Weston Machine, in which Automatic Scales are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Scales for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

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ter for \$30,500. They were appraised at \$45,000 each.

It is reported that Charles F. Brush, of Cleveland, has just sold English patents for his electric lighting apparatus to a large incorporated company in London for £30,000.

The Grant Furnace, which was built for charcoal, is doing excellently on coke and gray limestone ore, making an average of 14 tons per day (on charges of 950 lbs. of coke, 1300 lbs. of ore and 700 lbs. of limestone), mostly mill iron, though some excellent beds of foundry iron have been cast. As no changes, excepting a flue to lead off superfluous gas, were made at the furnace, her success is encouraging. She will continue on coke, if she can obtain enough to run her, until her charcoal comes in next spring.

The Dover Fire Brick Company, Canal Dover, have added to their works a new stack and kiln, and are putting in a Stevenson clay mill and Martin brick machine, which will raise their capacity to 18,000 bricks per day. Their trade has never been so large as the past season.

INDIANA.

The merchant mills and steam forge works around the Falls of the Ohio, at New Albany, are run double turn. The rail mill is temporarily idle, making extensive repairs, and will probably make large additions in the coming spring. The rail mill proprietors are offered many more orders than they are willing to accept, and it is not deemed prudent to make long time contracts on account of the advancing tendency of raw material. The Evansville Rolling Mill, one of the largest in Indiana, is being remodeled, and will be converted into a steel rail mill.

The nail works at Terre Haute, Greencastle, Aurora and New Albany, have had a pushing demand upon their capacity. The New Albany mills have not a single keg on hand to-day, and the spike mills of the Ohio Falls Iron Works are taxed to their full capacity. The New Albany rail mill will soon be in blast again, and will, it is said, be run on double turn. This mill has a capacity of 450 workmen, being the largest rail mill in the State.

KENTUCKY.

A new company has recently been formed and has leased the old Louisville Rolling Mill at Louisville. They have commenced to put the mill in complete order, expecting to start up on the 15th January inst. The mill, though having been standing idle for some time, needs very little repairs, as the machinery is first class and has been kept in complete order for immediate operations when required. Authorized capital of \$150,000 with \$60,000 subscribed. The officers are: C. P. Moorman, president; J. Morgan Coleman, vice-president; L. G. Quigley, secretary and treasurer. The mill will run principally on merchant iron and light rails.

The Bellefonte Furnace will not run this year, owing to trouble with its wood choppers.

The Iron Hills Furnace was forced to blow out on the 29th ult., owing to the falling of its hot-blast smoke-stack.

TENNESSEE.

The Cumberland Iron Works Company, an organization for the purchase of the old Cumberland Iron Works property of Wood, Yatenam & Co., in Stewart County, on the Cumberland River, is now organized, with Mr. J. P. Drouillard as president and treasurer, and Mr. Albert W. Harris as secretary. The incorporators, as heretofore announced, are Messrs. V. L. Kirkman, W. W. Berry, Samuel Pritchett, Joseph Vaulx, J. P. Drouillard, A. W. Harris and Thomas H. Malone. The company will proceed at once to manufacture iron. The ores of this valuable property, of which the supply is seemingly inexhaustible, are among the best that are mined in this country, and the iron hitherto manufactured from it has a reputation which insures a ready market anywhere. The company will establish an office in Nashville immediately, and, in the meantime, operations at the works in Stewart County have already commenced.

WISCONSIN.

The North Chicago Rolling Mill Co.'s mill at Milwaukee is filling an order for Bessemer steel plow beams for a Pittsburgh house. This company, which also operates the rolling mills and blast furnaces at and near Bay View, and the iron mine and blast furnaces at Iron Ridge, is erecting no less than 100 kilns for producing charcoal in the hard-wood lands along the line of the Milwaukee, Lake Shore and Western Railway, north of Oshkosh.

MISSOURI.

The sheet iron rolling mill now being completed for the St. Louis Stamping Company, will be one of the largest mills in the West. When it was first considered, it was the intention of the company to erect a small mill such as would supply simply their own requirements, but further consideration induced them to build a mill whose capacity will be very large. The mill will be put in operation about the 1st of February. The sheet iron required by the company for such work as they manufacture must be of the best quality of iron, possessing toughness and elasticity.

MICHIGAN.

The mine at Quinnesec is lighted with an electric light.

There is a prospect that the Deer Lake Furnace will be put in blast at an early day.

The officers of the Deer Lake Iron and Lumber Company are at present making overtures to Eastern parties, with a view to selling or leasing the plant.

COLORADO.

Major Henry McAllister, Jr., formerly Secretary of this Association, but now a resident of Colorado Springs, Colorado, in a recent note to this office, has embodied the following information relative to iron enterprises in his State: "The only iron works in this State at this time is the Denver Rolling Mill, owned by the Denver Rolling Mill Company, located in Denver. This is the same mill that was formerly operated by Messrs. Faux, Fowler & Co., at Danville, Pa. It was removed from the latter place

to Pueblo in this State two years ago, and from Pueblo to Denver within the past year. Although prepared to re-roll rails, it is at present running on bar iron and small rails for mine tramways, re-rolled from old wrought scrap, old rails, &c., purchased here. It has a capacity of 12,000 tons per annum. It is a re-rolling mill exclusively. A company called the Colorado Coal and Steel Works Company has been organized to mine coal and make iron and steel in Southern Colorado, but nothing has as yet been done in the way of building works."

Bulletin American Iron and Steel Association.

LABOR AND WAGES.

The strikers of the coal mines at Wampum, Pa. have carried their point, and are receiving 95 cents a ton instead of 90.

It is thought that the boiler makers and sheet iron workers in St. Louis, Mo., will soon make a demand for an increase in wages, although they have taken no decisive steps yet.

All the coal miners of the Pennsylvania Central road have resumed work at 3½ cents a bushel.

Some of the blacksmiths and grinders in Klein, Logan & Co.'s Birmingham Tool Works are out on a strike for an advance in wages. All the other workmen in the establishment are satisfied with their present wages.

The Himrod furnace at Youngstown, O., is running successfully with its new set of men who were taken on to replace the strikers.

During the strike at Scottdale (Pa.) Rolling Mill, the union men who had been thrown out of employment were accustomed to call it Scrapdale, and to tell wonderful stories of the bad work done by the so-called "black sheep." We are informed that this mill has run a year without breaking a roll. This does not indicate very bad work. Indeed, it is better work than the old hands did.

Seventy-five cents per ton is now paid the coal diggers at Ironton Tunnel, Ohio.

The Campbell Creek mines are running at 3, 3¼ and 3½ cents per bushel.

Wages for roughing at the 8-inch rolls at the rolling mill at Zanesville, Ohio, are about \$3 per day.

The action of the Muck Rollers at Wheeling, in establishing a uniform price is being used as an argument at other points.

The Railroad Coal Exchange at Pittsburgh have acceded to the demand of the miners, and are now paying 3½ cents per bushel.

The price paid in the Kanawha coal field now is 3¼ cents per bushel.

The coal miners in the vicinity of Brownsville, Pa., are all at work now at 2½ cents per bushel as the ruling price.

In 1860 and 1861 the uniform price paid for digging coal at Pittsburgh was 2½ cents per bushel for railroad mines and 2 cents for river mines.

The coal miners at Pomeroy, Ohio, have taken action regarding some miners who refuse to work at their dictation that even the Labor Tribune cannot defend. A report of the meeting states that the following motion was made: "Resolved, That there be no more 2½-cent coal mined at present in this bend, and that if Horton's men refuse to come out they be brought out." The resolution passed with but few dissenting votes.

The dragouts of the National Rolling Mill, Pittsburgh, struck for \$1.50 per day last week. They were getting \$1.25. The rollers yielded, and work went on.

A set of hands were discharged at Carnegie Bros. & Co.'s, Pittsburgh, for refusing to change a set of rolls which it was their duty to do. They appealed to the Mill Committee—being members of the Amalgamated Association—but the committee sustained the employers.

The miners in the vicinity of Pardoe, Mercer County, Pa., received an advance of 15 cents per ton recently.

The furnaces in Lawrence county, Ohio, are paying from \$1.50 to \$1.75 per ton for digging ore.

The wages of the employees of the Isabella blast furnaces, Pittsburgh, have been advanced.

The glass cutters, layers-in and layers-out, at Pittsburgh glass houses, are to receive 10 per cent. advance in wages, beginning with 1890. The first named talked of a strike 4 months ago, but finally decided to await events. The other workmen named did suspend operations for a few days, but finally went back.

A delegate convention of river miners will be held in Pittsburgh this week. The wage question will furnish the material for discussion. The railroad miners still adhere to the absurd idea of basing their scales of prices for digging on the price paid for boiling iron.

The Union men in Zanesville who were displaced by the Belgians, have been engaged by Mr. Schmertz for his Columbus works.

Under the recent advance in iron in the West, the puddlers at Pittsburgh receive 75 cents a ton advance, making the wages \$6.25. The puddlers at Cincinnati receive \$6.50. Bar heating and rolling at Pittsburgh will be 82 cents.

The pipe cutters at the Reading (Pa.) Iron Works are on a strike.

Reviewing the progress of Eastern cotton mills during the past year, it is noticed that important improvements have been made in several departments of cotton spinning, as regards the opening, carding and spinning machines. The "Clement attachment" is one of the longest strides that has been made for years past. The process is the natural one, and the machinery is simple. The cotton is taken from the field in the seed, and is worked more naturally than by any present known or used process. The effect of this invention (which is applicable alike to Northern and Southern mills) will be to very much lessen the amount of machinery used, and in time it will doubtless supersede the present forms of opening and picking machinery. Improvements have also been made in weaving machinery, in the sizing apparatus, also in ring spinning, which may in time supersede mule spinning.

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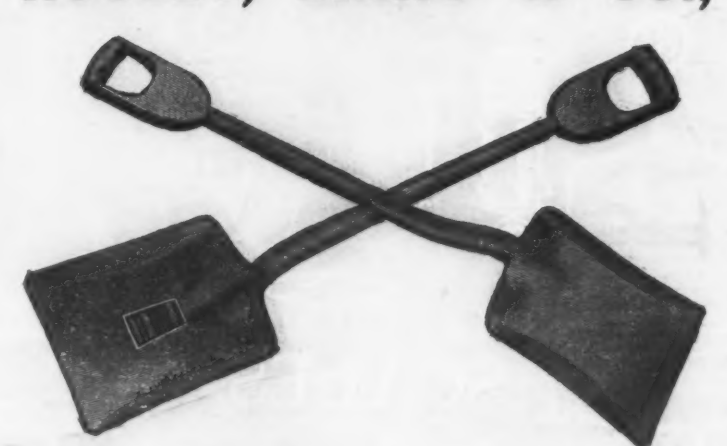
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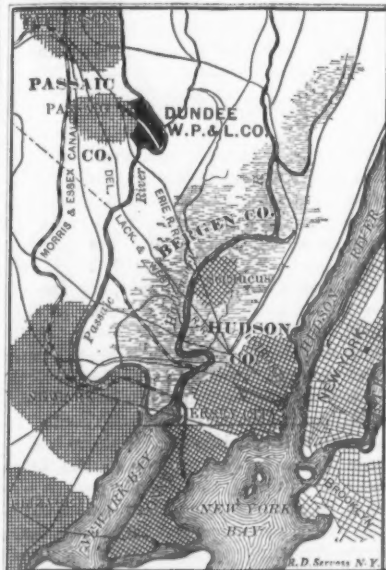
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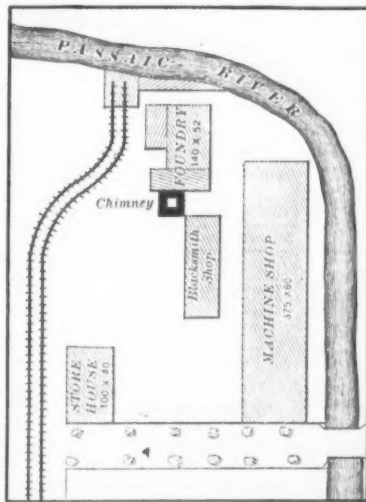
Map showing advantageous location of Passaic, N. J., as a manufacturing center.

The property of this company is located at Passaic, New Jersey, at the head of navigation of the Passaic River, only 12 miles from New York and 4 miles from Paterson. It is located directly on the line of the Erie Railroad. By means of a dam and canal, both constructed in the most permanent manner, the entire water power of the Passaic River is conducted to the company's mill sites, by which is obtained a fall of twenty-two feet. Competition by both river and rail insures the lowest rates of freight transportation, and the close proximity of several large manufacturing cities, viz., New York, Paterson and Newark, secures a great advantage in respect to labor. There is at present in operation a dozen manufacturing establishments, giving employment to a large number of hands. The location is perfectly healthy, cost of living is cheap, and there are good churches and excellent schools. Cheap illuminating gas and healthy city water are also to be had. The permanency of the mill water power is assured. The water is delivered to each mill through a canal 80 feet wide.

Among the manufacturing establishments at present located on this property are the New York Steam Engine Co., Rittenhouse Mfg. Co., woolen mill; Messrs. Waterhouse Brothers; Busch & Sons, both woollens and hosiery; Reid & Barry; Passaic Print Works.

The establishment of the New York Steam Engine Co. is now for sale owing to a dissolution of the company. The works comprise eight substantial one and two-story brick buildings, and consist of Manufacturing Shop, 55 feet by 60 feet; Foundry, 120 by 52 feet; pattern shop, 100 by 40 feet; Shop, 50 by 40 feet; Bridge and Boiler Rooms, of about 20 by 20 feet each, together with additional smaller buildings, called the Engine House, for 75-horse power turbine, and the Fire Engine House. These works are located directly on the Passaic River, with good depth of water. In every respect this location is particularly desirable for manufacturing purposes. Liberal terms will be made by the company with desirable parties. Full information will be furnished by mail or personally by application to

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Plan of the works of the New York Steam Engine Co., offered for sale.

The American Iron Trade in 1879.

Preliminary Report by James M. Swanwick,
Secretary of American Iron and Steel Association.

The year which has just closed was a most remarkable year in the history of the iron trade of this country. When complete statistics are received, it will be found that we made more pig iron, more bar iron, more rails and more steel than in any previous year. The advance in prices during the year was also without precedent. To speak more specifically, the percentage of increase in prices in all lines—except, perhaps, in crucible steel—was greater in 1879 than in any preceding year, if allowance be made for the premium on gold during the war, the advance in 1879 being on a gold basis of values. The importations of pig iron, old rails and new iron and steel rails during the year were unexpectedly large, recalling our experience before the panic of 1873, while our importations of iron ore were not only exceptional in their magnitude, but phenomenal, amounting to about five times as many tons as were ever before imported in one year. But the most remarkable fact in connection with the history of the American iron trade for 1879 remains to be stated. Notwithstanding all the activity that has been mentioned, the demand for pig iron, iron and steel rails and iron ore was not met, and many orders have been carried over to the new year which consumers sought in vain to have filled in 1879. The business embraced in the orders which were necessarily deferred to the new year amounts to a very large percentage of the actual consumption of the old year. Such a sudden and powerful stimulus to the demand for iron and steel and ore, following a period of great depression, was not expected by any of our manufacturers, and to the excitement caused by the suddenness of this demand the rapid advance in prices is mainly due.

Turning from generalities to particulars, we present below a careful estimate of the production in 1879 of pig iron, iron rails and steel rails, compared with the actual production of these articles in 1878; to which we have added the probable importation in 1879 of pig iron, old rails and other old iron for remanufacture, and new iron and steel rails, compared with actual importations in 1878. The tons used are gross tons of 2240 pounds. We also add the production of the Lake Superior iron ore mines in 1878 and 1879, with the probable importations of iron ore in both years. No means exist for ascertaining the production of all the ore mines of the country, but it may be stated that the production of the important mines of Lake Champlain, New Jersey and Missouri was greater in 1879 than in 1878.

	1878. Gross tons.	1879. Gross tons.
Pig Iron and Old Rails.		
Production of pig iron.....	2,301,215	2,800,000
Importation of pig iron.....	66,503	275,000
Importation of old rails and other old iron.....	5,558	175,000
Total.....	2,373,276	3,250,000
Rails.		
Production of iron rails.....	288,294	450,000
Production of steel rails.....	499,817	650,000
Importation of iron and steel rails.....	9	60,000
Total.....	788,120	1,160,000
Iron Ores.		
Lake Superior production.....	1,125,231	1,150,000
Importation.....	31,400	300,000
Total.....	1,156,631	1,450,000

We have not ventured on an estimate of the production of rolled iron in 1879, but, excluding iron rails, which are noticed above, it was probably 20 per cent. greater than in 1878, when the total production, not including iron rails, was 1,100,612 gross tons.

In the table given above the probable consumption of pig iron in 1879 is not fully indicated by the figures of production and importation; to these must be added a reduction during the year of the stocks of domestic pig iron in the hands of the makers and unsold at the beginning of the year. These stocks amounted at that time to 513,004 gross tons. The quantity of unsold domestic pig iron at the beginning of the new year cannot be so great as it was a year ago.

In the following table we give the prices at Philadelphia and in Pennsylvania, of various iron and steel products on the 1st of January, 1879, and the 1st of January, 1880, with the percentage of increase in the intervening year. The prices are fair average quotations:

Articles.	Jan. 1, 1879.	Jan. 1, 1880.	Percentage of increase.
No. 1 anthracite foundry pig iron in Philadelphia.....	\$17.00	\$25.00	105
Best refined bar iron in Philadelphia.....	48.56	71.68	63
Bessemer steel rails at works in Pennsylvania.....	48.00	70.00	67
Best iron rails in Philadelphia.....	34.00	57.00	68
Cut nails by the keg in Philadelphia.....	2.10	4.25	102
Old iron rails in Philadelphia.....	19.00	35.00	89
No. 1 wrought scrap in Philadelphia.....	30.00	34.00	70

Such a rapid rise in prices as is here shown, we have already remarked, has never before taken place in one year in this country, except during the war; but if allowance be made for the depreciation in the currency in that period the present rise is absolutely without parallel.

The year 1879 was also remarkable for the new impulse which it gave to the building of railroads. About 4000 miles were built during the year, against 2747 in 1878, 2177 miles in 1877, 2657 miles in 1876, and 1758 miles in 1875. The mileage of 1879 was equal to that of 1873, which was 4069 miles. The greatest mileage in any one year was in 1871, when 7608 miles were built. The increased demand for rails for new roads in 1879 was one of the leading causes of the revival in the American iron trade, but a more potent cause was the sudden demand last spring by existing roads for rails, cars and locomotives to meet the requirements of increased transportation of agricultural products, and to compensate for the wear and tear of the hard times. The increased railway mileage of the year was expected, but the wild scramble by the old roads for new rails was not, and the

rail mills of the country were placed at a disadvantage through no fault of their own. They had vainly urged the officers of many of the leading railroads to purchase rails in 1877 and in the first part of 1878, when prices were very low, and as a consequence of the refusal of these roads to give out orders, the mills were compelled in those years to run but a part of their time. The railway officials not only missed their opportunity to buy rails at low prices, but they precipitated by the suddenness and magnitude of their demands last summer the excited condition of the market, which still continues, and which all thoughtful business men deprecate.

The business of building iron ships did not improve in 1879, owing partly to the lack of encouragement by the general government and partly to the high prices for iron and other materials. The New York elevated railways, which gave to the iron trade of the country a much needed lift in 1878, were still further extended in 1879. The manufacture of steel wire fencing was greatly extended during the year, about 20,000 tons of steel being consumed in this new industry. There was a large demand during the year for iron pipes and tanks for the Bradford and other oil regions.

The production of both anthracite and bituminous coal during 1879 was greater than in any previous year in our history. Very great activity prevailed in the Connellsville coke region during the last three quarters of the year; many new mines were opened and many new ovens were erected. The production of 1879 was almost double that of 1878. Prices of course advanced. In the anthracite region there was less excitement, and prices did not greatly advance, but the production was largely increased above the highest figures ever before attained. The total production, in which is included the consumption in the region as well as shipments, was over 26,000,000 tons. The best record ever before reached was in 1873, when 21,227,952 tons were produced. The production of 1878 was only 17,605,262 tons, all told. These figures we obtain from Mr. John H. Jones, and they may be accepted as reliable.

The large importations during 1879 of pig iron, old iron, iron and steel rails, and iron ores will attract attention and are worthy of the most serious consideration. One incident of these importations should not be overlooked—they occurred mainly in the last six months of the year, and are, therefore, all the more suggestive. They should teach our manufacturers that the English policy of piling up iron in bad times to be prepared for good times is a safe policy to follow; that they should supply the home demand for iron products, and thus keep out foreign importations; and that it is the worst possible policy in a financial sense, and the worst possible statesmanship, to buy ores or any other raw material abroad when the undeveloped resources of such States as Michigan and Virginia could supply all wants. These importations teach still another lesson, and we hope that it may receive instant attention. When the tide in the present demand for iron and steel begins to ebb, as it must ebb some day, will it be safe in that day to have duties on foreign iron and steel lower than they now are? When orders again slacken and prices again fall in this country, prices abroad will also fall, and, if our tariff be lower then than it is now, the iron industry of this country, with high wages and high freights, will once more be crippled and helpless.

Experience has taught us that it is not safe to prophesy what any new year has in store for the American iron trade. We will, therefore, simply state what probably every person in the trade already knows, that more furnaces and mills will be running in 1880 than in 1879, and that, as a consequence, our iron and steel production in the new year will be greater than in the old year. After the 1st of April it will be fully equal to the demand in all lines. Whether prices will remain as high as they are or go still higher, no man can find out, nor whether we will build more railroads in 1880 than in 1879. It seems certain that our importation of iron ore in 1880 will be larger than in 1879, large contracts having already been made. Probably 500,000 tons will be imported in 1880. We regret that this should ever have become necessary. Whether importations of iron and steel shall increase in the new year depends partly on the course of prices at home and partly on the action of the present Congress. The steel blooms bought during 1879, aggregating considerably less than 50,000 tons, have not yet arrived.

Zanzibar.—American commerce with Zanzibar is steadily growing, that being a central point on the Eastern coast of Africa for the destination of commodities. Trade is largely in control of natives of British India. The population of the island, which is about 50 miles in extreme length, surrounded by coral reefs, number 300,000, including Arabs, and negroes in a state of servitude. Exports are chiefly made up of cloves, ivory, gum, coal, &c. A recent letter from Zanzibar says a single invoice of cloves taken by an English steamer, was valued at \$250,000. There are several American firms who ship spices, gums, hides, &c., to the United States to the value of a few hundred thousand dollars per annum, in exchange for cotton and oil. Of late it is observed that the export of cotton cloths to Zanzibar is becoming a formidable item, two cargoes having gone from Boston only last week, comprising 3200 bales, or 3,047,686 yards, valued at \$208,000. A feature at Zanzibar is an English ship anchored near by, serving as a rendezvous for a fleet of steam launches, which act as a sort of police, scouring the surrounding seas and coast of the main land, for the suppression of illegitimate trade and slave traffic. The statement is that these police, subjects of Great Britain, receive \$20 a ton for every slave dhow and \$25 for every slave which they may capture. Though in a measure self-constituted and liable to abuse, the authority thus exercised is spoken of as a wholesome influence, under which every lawful enterprise can prosper. American merchants are giving more attention to this remote part of the world, with hopeful prospects.

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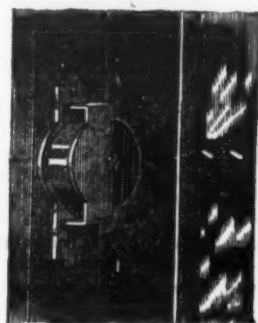
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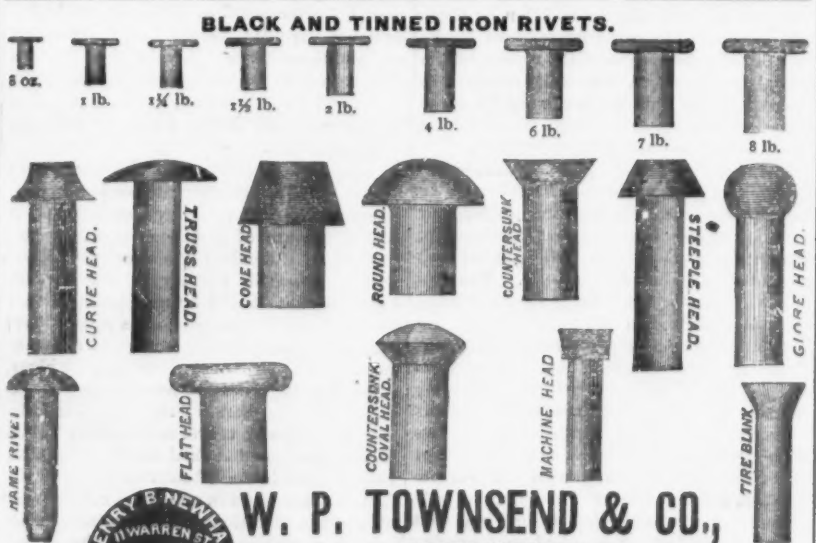
The Anti-Window Rattler supplies a long needed want; it is so simple in construction that it can be used on any window, and so complete that it will prevent the slightest shaking, no matter how great the jar or how old the sash. As shown in cut, it consists of a rubber wheel in a nickel-plated or brass frame; is ornamental as well as useful, and does not interfere with raising or lowering the sash.

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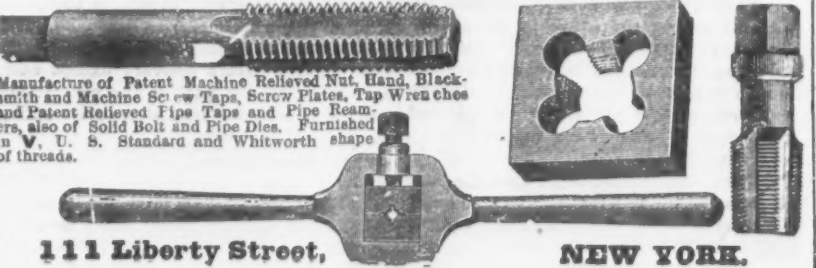
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111 Liberty Street, NEW YORK.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, January 8, 1880.

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CONTENTS.

First Page.—Management of Steam in Fac-
tories. Trade with Brazil. Copper Rolling
Mills for the Pacific Coast. A Large Steel
Steamship.
Third Page.—Melting Iron with Coal and
Coke in Foundry Cupolas. The New York State
Interest Law.
Fifth Page.—The Effect of Reducing Agents
upon Copper Alloys.
Seventh Page.—The Effect of Reducing
Agents upon Copper Alloys (Continued). Jap-
anese Tariff Revision. Production of the Krupp
Works.
Ninth Page.—Industrial Items.
Eleventh Page.—Industrial Items (Con-
cluded). Labor and Wages.
Thirteenth Page.—The American Iron Trade
of 1879. Zanzibar.
Fourteenth Page.—The Colonial Movement
in Europe. Some Surprising Features of the
Tay Bridge Disaster. Pittsburgh Riot Echoes.
Fifteenth Page.—The Western Iron Trade.
Metallurgical Notes. J. Lloyd Haigh's Irregu-
larities.
Sixteenth Page.—Trade Report. General
Hardware.
Eighteenth Page.—General Hardware (Con-
tinued).
Nineteenth Page.—General Hardware (Con-
cluded). British Iron Market. Iron. Metals.
Coal. Imports. Exports. Old Metals. Paper
Stock. &c. Philadelphia.
Twentieth Page.—Philadelphia (Con-
cluded). Pittsburgh. Chattanooga. Boston.
Cincinnati. Baltimore. St. Louis. Richmond.
Louisville. Our English Letter.
Twenty-second Page.—Our English Letter
(Continued). Annual Review.
Twenty-third Page.—The Iron Age Direc-
tory.
Twenty-sixth Page.—New York Wholesale
Prices.
Twenty-seventh Page.—New York Wholesale
Prices (Continued).
Thirty-third Page.—Philadelphia, Buffalo,
Chicago and Pittsburgh Hardware and Metal
Prices.
Thirty-fifth Page.—Boston and St. Louis
Hardware and Metal Prices.

On another page we print an interesting
report by Mr. Swank, Secretary of the
American Iron and Steel Association, which
understood to be preliminary to his an-
nual report. It presents, as fully and accu-
rately as circumstances will permit, the sta-
tistics of the iron and steel trades of this
country for 1879, and deals guardedly with
the problem of the immediate future. From
Mr. Swank's calculations—which are rather
more than estimates—we learn that 1879
was the year of largest production and
greatest activity. The make of pig iron
reached 2,800,000 gross tons; of rails,
1,100,000 gross tons; of rolled iron other
than rails, 1,100,612 gross tons. What Mr.
Swank says about the tariff merits careful
consideration. It is well to keep the future

in mind in all changes of duties, and to con-
sider whether a rate which would be ade-
quate under such conditions as exist for the
moment, would not mean the ruin of our iron
industries when times change and the de-
mand shall fall below the ability of our iron
works to meet it. However we may argue
the case theoretically, the practical fact re-
mains that iron cannot be produced here as
cheaply as it can abroad. We have many
and great natural advantages, but we have
also long transportation and high freights;
we pay higher wages to labor, and capital
here commands higher rates of interest.
Time may change all this—the sooner if, by
a continuance of judicious protection, we
promote the development of our own re-
sources and place our industries on a substantial
and permanent basis. The history of pro-
tection in this country has amply vindicated
all the claims of those who were instrumental
in securing it. But there always was—and
probably always will be—a large class who,
in matters of statesmanship, cannot look be-
yond the immediate present, and from this
class may be expected the efforts likely to be
made this winter to reduce the rate of duty
on several important classes of iron and
steel manufactures.

The Colonial Movement in Europe.

Since 1873 most of the manufacturing
nations have felt the necessity of finding an
enlarged export field for their goods. Great
exhibitions have been held, the consuls have
been instructed to report from all quarters
of the globe, economic questions have been
more carefully studied, new lines of steam-
ers have been subsidized, and greater atten-
tion than ever has been bestowed by coun-
tries which have colonies upon stimulating
active commercial intercourse with them.
The wretched colonial system of some of
these countries has been materially changed,
for the doctrine that a distant colony cannot
be retained by the mother country by mere
force is now universally acknowledged.
Even Spain has recognized this by liberating
the slaves in the island of Porto Rico, and
by finally making such political concessions
to the Cubans as to induce them to lay down
their arms. Errors under which Europe
has labored since the close of the fifteenth
century have at length been mended, or at
least mitigated, and good will toward dis-
tant possessions now rules the councils of
the leading maritime nations of the old
world.

Several of the great nations of Europe
never had colonies beyond the Mediter-
ranean—for example, Italy, Germany and
Austria. Even they have of late years sent
out scientific expeditions, and are trying
hard to gain a foothold on some distant
shore. Wars have been, and are even now,
waged with no other object than to expand
national trade. Russia, excluded by the
jealousy of Western Europe from an outlet
to the Mediterranean (as legitimate as our
Mississippi outlet in the Gulf), has not shrunk
from a costly war, incalculable in its conse-
quences, in order to wrest the Golden Horn
from Turkey. England's wars in Afghanistan
and at the Cape of Good Hope have had no
other object than the securing of trade. The
rivalry between Russia and England in Asia
is commercial rather than political, for
both countries have more land than they
can take care of conveniently; and Russia
sold Alaska to us because its real interests
center elsewhere.

In thus developing an unusual amount of
activity for the expansion of trade the great
commercial nations, including ourselves,
acknowledge the fact that the industrial
branches cannot be kept under restraint,
but are bound to grow; that instead of cur-
tailing or abandoning an otherwise prom-
ising manufacture, it is more advisable to
create new markets for its product, even at
great national sacrifices. The good results
are daily becoming more evident, for with-
out this feverish anxiety to expand trade,
the people of Great Britain would have
succumbed to a panic last fall. But they
know and feel that their government will
shrink from nothing to widen the circle of
British usefulness in distant lands, and the
wars waged, though iniquitous and unpro-
voked, are nevertheless popular because
they all tend to this same end. Thus the
acquisition of Cyprus is approved, because
in reality it secures the Isthmus of Suez
without directly offending France, and be-
cause there is a latent conviction that
Cyprus will yet become as great a commer-
cial success as Gibraltar, Malta, Singapore
or Hong Kong.

As for ourselves, we are perfectly content
to see others get the hot chestnuts out of the
ashes for us. There is no flourishing British
colony but brings us a large trade and money.
In order to show the enormous importance to
American trade of the joint British colonies,
we have drawn up a table which, in thou-
sands of dollars, contains the trade of each
colony, however small, in 1876, with the
inward and outward tonnage in thousands
of tons, and we have added thereto our in-
tercourse with each great division during
the fiscal year 1877. From this it will be
perceived that in 1876 the British colonies
did an aggregate business with other coun-
tries and among themselves of \$1,622,920,000.
In the same year we transacted with them
business to the amount of \$123,268,000,
which is some 7 per cent. of the whole,
about double the percentage of our trade
with Spanish America and Brazil.

A trade of such magnitude, besides the
enormous dealings we have with England

herself, is a matter of vital interest to us,
and only confirms the correctness of the
general sentiment among American mer-
chants, that whatever benefits British com-
merce abroad also redounds to our advan-
tage.

We cannot be expected always to approve
and admire the methods adopted by the
English in extending their political and
commercial empire, and they are quite in-
different to what we think of them; but the
result, the new fields of trade, are invari-
ably welcome to us.

General Trade of the Colonial Possessions of Great Britain and our Trade with them.

	General trade.		In and out- ward ton- nage.	America's trade with British Colonies.	
	Cal. year, 1876.	Import. Export.		Fiscal year, '77.	Imp. Export.
Gibraltar	50,460	15,090	4,165	47	22
Malta	97,095	84,340	5,917	22	2,545
Newfoundland	7,595	6,835	26,045	2,302	38,132
Bermuda	1,235	375	151		
Honduras	815	1,030	70		
Bahama Islands	770	55	133		
Turks Island	120	160	141		
Jamaica	8,505	7,584	833		
Virgin Islands	15	21	4		
St. Christ's	65	40	6		
Nevis	100	275	19		
Antigua	720	715	12	6,431	308
Montserrat	120	120	12		
Dominica	305	395	26		
St. Lucia	535	220	39		
St. Vincent	775	915	45		
Barbadoes	5,140	4,820	351		
Grenada	575	595	157		
Tobago	275	420	14		
Trinidad	8,370	8,185	417		
Guiana	9,595	15,145	439	3,206	41
Falkland Islands	135	185	45		
India	200,040	301,460	5,429		
Aden	26,615	55,115	4,006	10,726	3
Ceylon	27,815	22,550	2,305		
Hongkong	227,515	315,470	6,583	1,171	1,037
Australia	29,150	18,184	779	1,037	13,980
Cape	2,315	2,385	139	1,476	105
Sierra Leone	1,050	1,740	281		
Gold Coast	2,250	2,125	175		
Senegal	445	430	69		
St. Helena	460	230	69		
Lagoa	2,385	3,095	281	1,023	21
Mauritius	11,420	10,770	519		
All other				103	53
Totals	799,550	890,370	44,001	50,529	3,741
				126,397	

The preceding table shows the importance
of a small spot like Gibraltar with 4,165,000
tons trade, Malta with 5,205,000 tons, the
Straits with 4,006,000 tons, and Hong Kong
with 4,360,000 tons—places to which, on an
average, we ship annually some \$20,000,000
of domestic products alone. We have, there-
fore, every reason to wish the Colonial move-
ment in Europe success. France, Spain,
Portugal and Holland may do much on their
part also, as their necessities compel them to
stimulate export, and we shall be glad if their
expectations are more than fulfilled.

Some Surprising Features of the Tay Bridge Disaster.

Mr. Edward Gilkes, of Hopkins, Gilkes &
Co., builders of the Tay Bridge, part of
which lately fell into the water and left a
gap through which a train plunged, has sent
a cable dispatch to the *Herald*, of this city,
from which we take the following: "The
velocity of the wind as registered at Dun-
dee on the night of the disaster was 42, an
amount of pressure quite sufficient to over-
set the train; and the gale rails on the
windward side could not prevent the upper
part of the carriages from striking the
girders. This might cause the damage by
destroying the unity of the leeward girder,
and another violent gust would bring about
complete ruin." This sounds very much
like special pleading, inasmuch as it is not
known whether the bridge fell before the train
started to pass over it, or whether the derail-
ment of the train by the wind caused such a
shock as to destroy the strength of the struc-
ture. It is not our purpose, however, to ven-
ture any criticisms on the material or con-
struction of the bridge in addition to those
which appeared in our columns two weeks
ago, until in possession of the results of the
official investigation which is already in
progress. But the disaster suggests some
thoughts concerning the management of the
bridge which are not without interest.

The fact that it is not known whether the
train wrecked a previously sound span by
being overturned against the girders, or
whether it plunged through an existing gap,
shows that it was not so well guarded and
protected as it should have been. The prop-
riety of sending the train across under the
circumstances, when the wind was moving
with sufficient velocity to overturn it, is cer-
tainly open to question; but to start it on
so perilous a journey without knowing
whether the bridge was intact or not, seems
to savor of criminal recklessness. Hours
after the train had plunged to the bottom of
the Frith, it was not known for certain
whether it had started to cross, and the only
reason for supposing that it had was that
men on the further side had seen moving
lights, supposed to be those of the train,
which had suddenly been extinguished after
a shower of sparks had been seen for an in-
stant. The people on the other shore seem
to have had no more certain knowledge
whether the train which they knew had
started had crossed safely, and the terrible
facts of the case were only guessed at when
a party of gentlemen made it their business
to crawl out to the brink of the chasm.
Until they returned and reported what they
had seen no one on either shore knew
how to interpret the fears which naturally
grew out of the previously unexplained
movements of what were supposed to be
the train lights.

If these assumptions, based upon the very
full telegraphic reports received the day
after the disaster, are warranted by the
facts, we think they indicate a shameful
negligence on the part of those respon-

sible for the bridge and its care. In the
first place, a train should never be al-
lowed to venture on a long bridge during a
dark and stormy night, until it is known
that the bridge is at least standing through-
out its entire length. This involves some
expense, as watchmen must be stationed at
points along its line, and some system of
electric communication maintained which
will give instant notice of the rupture of
any member upon which the strength or con-
tinuity of the bridge depends. We hear
much of the excellence of British railway
management, the completeness of British
railway equipment and the benefits secured
by holding the companies to a strict account-
ability; but when such a structure as the
Tay Bridge is left unguarded from end to
end, and a train is allowed to start across it
without any assurance that the greater part
of it has not fallen; when this train plunges
into the water and it is hours before any
one knows for a certainty what has become
of it, we grow a little skeptical as to
whether they do things better in England
than here after all. We know of long bridges
in this country which are not commonly re-
garded as "triumphs of engineering skill,"
and which no one would go half a mile to
see. They are merely long bridges, which
make the average passenger feel a little
nervous at the idea of crossing them;
and yet they are probably the safest
parts of roads which can show a re-
markable immunity from accidents. They
are patrolled day and night by trustworthy
watchmen; signals are provided which
give instant warning of any danger, and
no conductor would venture on them by
day or night without the assurance from
signals which cannot go wrong—unless by
giving warning of danger where none ex-
isted, owing to some derangement of the
circuit—that all was clear. It is known at
the opposite end when a train starts, and its
progress as it passes the several stations is
recorded. Such bridges might fall and
carry the trains with them; but the fact of
an accident would at once be known, and
there would be no question as to whether
the bridge fell before or after the train
struck it. In the case of the Tay Bridge
there seems to have been no such provision.

What Mr. Gilkes has to say in his cable-
gram, in explanation of the accident, con-
trasts somewhat strongly with what he said
in an article contributed to *Engineering* in
March, 1877, concerning this same bridge.
We quote as follows: "A consideration of
the action of the wind on this bridge will
dissipate the often advanced theory that
at some period it will be blown over. The
exposed surface of one large pier is about
800 square feet, and of the superstructure
which depends upon it about 800 more,
and so, giving 800 feet for a train above,
we have 2400 feet. Twenty-one pounds
per square foot is the force of a very
strong gale, but it would take no less than
ninety-six pounds per square foot on the
surface given to overturn the pier. Even
the most severe hurricane on record would
"equal only one-half this resistive power."

If Mr. Gilkes meant what he said in the
article above quoted, and had an intelligent
reason for the faith that was in him, how is
it that a wind moving at the comparatively
low velocity of 42 miles per hour wrecked
the bridge? A 42-mile blow is not so much
of a hurricane as to be classed among the
most severe on record. It only gives a
pressure of about 9 pounds per square foot
of surface exposed to its direct force; but
this pressure seems to have been great
enough to have caused the destruction
of 12 or 13 spans. The fact that the piers
were not overturned, so far as we can learn,
does not give Mr. Gilkes' 1872 argument
any additional force. Accidents at bridges
seldom occur at the piers, but between
them, and in calculating the strength of a
bridge we must begin and end with its
weakest points.

However regarded, the disaster shows
that the bridge, whether good or bad in con-
struction, was not properly guarded, and it
will be a cause of still deeper regret than
that which the calamity has caused if the
obvious lesson it teaches is not heeded.
Long bridges should be well guarded and
policed, and if experience has shown that
running trains across exposed embank-
ments, or high trestles, or long bridges,
when the velocity of the wind attains or ex-
ceeds a certain point is dangerous, it is desir-
able that railway travel across such points
should be suspended until the storm abates.
This is done in steamboat running, and the
fact that travelers in a railroad car know so
little of the conditions existing outside as not
to be in a position to decide for themselves
whether it is safe to go on or not, throws
additional responsibility upon railway man-
agers.

A recent dispatch from England contained
news which would have sounded more nat-
ural if it had come from Philadelphia or
Pittsburgh, or any other center of the iron
trade of this country. It was to the effect
that the North Staffordshire bar makers had
given notice that they would take no more
contracts for future delivery except upon
agreement, on the part of the contracting
parties, to take the iron at the price ruling
at time of delivery. This sounds very
much like a "boom." Public opinion in
Great Britain seems to be divided on the
question of how the revival should be under-
stood. The *London Times* lately asserted
that the current advance in iron is wholly due
to American orders, and hence must be re-

garded as temporary. The *Manchester
Guardian* says the facts are otherwise.
Speculation is weakening, but prices are still
rising in Staffordshire and South Wales, and
a further advance is considered probable.
It is to be hoped that this is true, and that
the large East Indian and New Zealand con-
tracts have given the market a strength
which is not wholly dependent upon a con-
tinuance of large orders from this country.

Pittsburgh Riot Echoes.

The losses resulting from the Pittsburgh
riots of 1877 seem in a fair way of settle-
ment. The attempt that was made to induce
the State of Pennsylvania to assume the
payment of the claims, and the scandals
connected with the "riot bill" in the
last Legislature of that State, are fresh in
the minds of our readers. The attempt
failed, and as the Supreme Court of the
State has decided that Allegheny County
must pay the losses under the law, the
county officers have been quietly at work
trying to effect a compromise with the
largest creditors, in order, first, to reduce
their claims to something near the actual
loss, and secondly, to see if for prompt pay-
ment, in place of a long and tedious litigation
with a somewhat doubtful result, better
terms could not be made with the losers.
The negotiations were chiefly with the Penn-
sylvania Railroad, which was the heaviest
claimant, the face of this claim being some
\$2,300,000 with accrued interest, bringing it
up to \$2,600,000. The Railroad finally con-
sented to take \$1,600,000 in lieu of its claim
if paid in 60 days. The other claimants
have filed claims to an aggregate, in round
figures, of \$1,400,000, but there is no
doubt they would be willing to compromise
on like equitable terms with the Penn-
sylvania Railroad Company. Assuming,
however, that no reduction is made in
their claims, the schedule would stand as
follows:

THE CLAIMS.	
Pennsylvania Railroad	\$1,600,000
Other companies	150,000
Freights	800,000
Private Property	150,000
Pullman Car Company	75,000
Keystone Hotel Company	32,700
Grain elevator	210,000
Total	\$3,012,000

It is believed that these claims, with the
exception of the Pennsylvania Railroad's,
can be largely reduced. At a meeting
held at Pittsburgh last week, at the in-
vitation of the County Commissioners,
composed of county officials connected
with the fiscal affairs, legal counselors,
and a number of the most prominent
and sagacious business men, representing
leading business interests in all depart-
ments, and holders of property as well, the
following resolution was passed, the opinion
being that a compromise without further
delay was advisable:

Resolved, That it is the sense of this meeting
that the county authorities, in cases in which,
in their judgment, reasonable compromises can
be effected with the holders of claims arising out
of the riots, should make such compromises, and in
cases where no reasonable compromise can be
effected, they should resist such cases to the ut-
most extent of the law.

A 5 per cent. bond will probably be issued
to meet the payments. This gives some hope
that, for the present at least, this vexed
question will be settled. We do not believe,
however, that Allegheny County will be
satisfied with it as a final settlement. They
still claim that in equity the loss should be
borne by the whole State, and it is more than
probable that in time the State will assume it.
One strong argument against its assumption
by the State last winter was the belief that a
fraud would be attempted in fixing the
amount.

Cheering intelligence comes from the
manufacturers of machine tools, particularly
such as are designed for heavy work. The
demands in this branch of industry are sig-
nificant, as indicating the recuperative en-
ergies of railway corporations and the varied
mechanical industries in which machinery is
used. One of our largest agencies in this
city reports that the manufacturers whose
products they handle have doubled their
working force within the last six months,
and are unable to keep up with the orders
pressing upon them. There are no machines
on hand, and they are taking orders for de-
livery from four to six months hence. It is
noticeable that these orders are now about
equally divided between railroad companies
and manufacturers, whereas the latter, un-
til lately, may be said to have done nothing
for several years. Another characteristic
of the times is the indifference of manufac-
turers to foreign orders. Exports, however,
continue fair. One large Philadelphia con-
cern are fitting up shops for a railroad in
Cuba, and are sending machine tools in con-
siderable quantities to Australia for similar
purposes. The more recent orders from
that source comprise four or five 60-inch
planers, besides large hammers, ranging
from two to three or four tons. A notable
sale is the great planer, 10 feet square and
35 feet long, made by Wm. Sellers & Co.,
for the Centennial Exhibition, which now
goes to Bethlehem, Pa. The same firm have
taken a contract for hydraulic machinery on
a large scale, to be used in raising and low-
ering cars between the first and second stories
at the proposed Fifteenth street depot in
Philadelphia. Altogether, our machine tool
manufacturers generally are as busy as in the
rushing times of 1869, and prices are ad-
vancing.

The Western Iron Trade.

ANNUAL REVIEW FOR 1879.

The year 1879 will be a memorable one in the history of the Western iron trade. It will be chiefly memorable for the low prices ruling early in the year, and for the rapid advance in prices that have taken place, a depression and advance unparalleled in its history. From the lowest point of the year there has been an advance in Pig Iron of fully 100 per cent, of Merchant Iron about the same, of Nails 133 1/2 per cent. The advance has also come about naturally, without any united action, and for that reason has been sustained. We give below a *resumé* of the market for the past year.

Ore.

The Ore market has shared in the general improvement, though as most of the Ore that is used in the furnaces West is contracted for early in the year, it has only been on the surplus that the heavy advance has been realized. The prices for the season's delivery were fixed early in the year at 50¢ per ton advance over the prices ruling in 1878. Sales were made of large lots at \$7.50 for Republic, \$6.75 for Champion, \$6.50 for Lake Superior, \$5.50 to \$6.00 for Menominee, varying with the units of metallic iron as shown by the analysis. The hematite sold at \$4.50. A peculiar feature of the ore market early in the season was the refusal of certain large consumers of Bessemer ores to pay the advance asked by the Lake Superior mines. This led to the largely increased development of the Menominee region, and also to the importation of foreign ores. With the improvement in the price of iron and the blowing of furnaces, as well as the increased make of those in blast, came a demand for ore. What was left unsold rapidly advanced in price, and under the stimulus of the demand the production of Lake Superior was pushed to a point never before reached, the total being between 1,300,000 and 1,400,000 tons. The price at the close of the year was almost anything the ore men chose to ask, but was for first grade, say, \$12 @ \$13 per ton. It is extremely difficult to forecast what the prices of ores will be for 1880. The high prices of Lake Superior have stimulated the prospecting for ores in other regions with an energy and determination never before evinced. The importation of foreign ores will also be largely increased. On the other hand, it is probable that but little standard Missouri ore will be sent to upper Ohio ports, as it will be used in the vicinity of St. Louis. Of course Lake Superior ores for 1880 will be higher than they were sold for in 1879, but the problem is how much will the advance be?

Pig Iron.

The course of the market during 1878 has been so decided, and its salient features have impressed themselves so firmly upon those interested, that we need but refer to them, more for the purpose of preserving the record in a connected form than for imparting information at the present. For the first five months of the year the market for Pig Iron at Pittsburgh was remarkably steady, but it was the steadiness of inaction rather than of strength. Consumers only bought for their immediate wants. Though stocks at the furnaces and mills and in brokers' hands were known to be very low, and although mill men anticipated a rise in metal, yet the future was so uncertain, and the time when the rise would come was so problematical, that they delayed buying and prices did not move upward. The first of June, however, witnessed the change. The new ore, which had been sold at an advance, began to arrive and the furnaces put up prices, especially for Pig Iron made from all ore. During this month the question of wages for boiling was settled, and this element, which had had a depressing effect on the market, was removed. The Pig Iron market at once felt the effect of these two facts. Buyers believing that the turn had come began to buy eagerly, and every pound of the small stocks at the furnaces that was in the market was sold, and many orders for futures placed. The eagerness of the mills to secure stocks for the orders they had taken for bars, and also to provide for future orders, sent the price up, and, as the table below shows, prices advanced gradually but steadily from June to August, when they took a rapid jump from \$18 @ \$22 to \$22 @ \$30 in September, and to \$28 and \$32 in October. The cause of the slowness of the advance in the summer months was the result of the doubt that existed in the minds of many of the best informed mill men as to the permanency of the improvement, but as orders for Merchant Iron not only came in freely, but forced themselves upon the mills, the doubters gave way and hurried into the market to cover their orders for Merchant Iron with Pig. In November, and indeed until the last of December, the market was somewhat sluggish, as the mills had about all the stock they desired, but as ore got scarcer and higher furnace men grew stiffer in prices, and as the mill men began to display some anxiety toward the last of the year to buy Pig, prices advanced sharply, and the year closed with \$40 asked for all-ore extra red-short Mill Iron, and some few sales reported at that price. The following table shows the range of prices at Pittsburgh of Gray Forge Coke or Bituminous Pig Iron, smelted in whole or part from Lake Superior ores, for the year 1879. These figures are compiled from actual sales:

January..	\$16.50 @ 19.50	July.....	\$17.50 @ 21.00
February..	15.50 @ 19.50	August....	18.00 @ 22.00
March....	16.50 @ 19.50	September..	22.00 @ 30.00
April.....	17.00 @ 19.50	October....	28.00 @ 32.00
May.....	17.50 @ 20.00	November..	30.00 @ 33.00
June.....	17.50 @ 20.00	December..	31.00 @ 35.00

Condition of the Coke and Bituminous Furnaces.

We have received but partial returns of the furnaces in and out of blast on the first of the year, which we collate below:

Partial List of Coke and Bituminous Furnaces in and out of Blast January 1, 1876, 1877, 1878, 1879 and 1880.

Locality.	In Blast.					Out of Blast.				
	'76	'77	'78	'79	'80	'76	'77	'78	'79	'80
Shenango Val.	12	11	12	8	18	20	30	10	23	13
Pittsburgh & vicinity.	6	6	7	8	10	5	5	5	4	2
Allegheny Val.	4	4	4	3	1	1	1	1	1	1
Junata and Conemaugh.	15	12	13	13	15	20	8	8	5	2
Yough Valley.	3	3	2	3	3	2	3	2	2	2
West Va.	3	1	2	3	3	3	5	4	3	1
Mahoning Val.	12	10	8	7	14	10	11	12	11	4
Hank. Rock.	8	4	6	4	8	7	11	10	13	8
Vario's Ohio.	10	10	21	14	24	7	12	15	20	10
Missouri.....	2	2	0	2	4	6	6	8	10	8
Total.....	77	69	75	64	102	78	85	90	95	58

This shows that there has been an increase of fully 50 per cent. of the furnaces in blast. Many of those out of blast will require extensive repairs before they can go in again. Five of the twelve that are out in the Shenango Valley, are in this condition, two others have gone in blast since the date of our report, and two others are being rapidly prepared.

Merchant Iron.

The first six months of 1879 were probably the most trying that the rolling mills of the West ever experienced. The year opened at Pittsburgh with eight mills idle, with prices for Bar Iron below the cost of production, the average selling price for good Bar Iron being 1.70¢ @ 1.75¢. As we remarked in our review of 1878, "There is no question but Iron must advance, or there is one outcome—bankruptcy." Early in the year some signs of improvement were manifest, but only to those of widely-extended connections with other industries. These saw that there was a prospect of increased activity in certain lines, but no one had any idea of what the result would be. One of the shrewdest of Western ironmasters said: "Iron will go to 2.25¢ before January 1st, 1880. It may go to 2.50¢." The result is it has gone to 3.50¢. There are at least four features of the market the past year that are exceptional. The first is, of course, the rapid advance. It is almost an axiom in commercial circles that it is easier to get prices down than to get them up again; 1879 seems to disprove this, for, while the decline was fought every step of the way and was slow, the advance was with a bound. A second feature is that in nearly every instance the full card rate has been obtained. This, of course, refers only to the last six months of the year. The price for one ton and 1000 has been the same. A third characteristic has been that in many cases iron has sold in advance of the card. Of course, this was only in cases where there was an extreme urgency, but this has been the chronic state of the market. When the card was 2¢, Iron sold in many cases at 2.25¢. When it was 3¢, sales were made at 3.30¢. On the other hand, of course, when these advances were made orders were on the books unfilled, and these very much more than offset any orders placed at the advance. A fourth feature has been the maintenance of the full card of extras, including the prices for cutting to length. It should also be noted that the mills have in no case seemed anxious to make the advance. The wisest heads have regretted that the condition of the market was such as to demand an advance, but when forced upon them, as every advance this year with the possible exception of the first, has been, they could only take it. The course of prices has been as follows: At the beginning of the year the nominal card was 2¢, though Iron was selling at 1.70¢ @ 1.75¢, and in some cases below this; the best brands could not be bought lower than these figures, and some makers refused even these. The price hung at this, but with a decided stiffening in the views of sellers, until the wages question was settled in June. In July the price went to 1.90¢; in August it bounded, and on the 28th of that month the Western Iron Association advanced the card to 2.50¢; September 26 it was again advanced to 3¢, and January 2 to 3.50¢.

Nails.

The improvement in the price of Nails during the year has been more marked than in any other department. Prices have advanced fully 133 1/2 %, or one-third more than double, and there has been not the least trouble to maintain each advance that has been made. In Nails, as in Merchant Iron, certain mills persistently refused to believe in the advance for weeks after others had become fully convinced that the improvement was genuine. For quite a while Pittsburgh prices were far in advance of those of Wheeling, the mills at the latter place refusing to operate with the Pittsburgh mills in the advances made by the latter; but recently there has been no doubt or cross purposes, and the last two advances have been the united action of Pittsburgh and Wheeling. The course of the market has been as follows: Late in 1878 the Western Nail Association met to consider what was known as the Powell plan for a pool to regulate production, and to keep the supply proportionate to the demand. The scheme was rejected, and Nails began to go still lower. In the spring sales were made as low as \$1.75 per keg, if not lower, and, with one exception, the mills at Pittsburgh ceased work rather than sell at the prices. The mill that continued in operation in part refused to take orders below \$2 card, and only run as it could get such orders. It began to look as though the report that certain mills had determined to "freeze out" certain others was true, but they were getting cold in the process. In June the market stiffened at Pittsburgh to \$2.25, but Wheeling still held its \$1.00. In June some of the idle Pittsburgh mills resumed, and early in July Wheeling advanced her card to \$2.10, still refusing to meet the \$2.25 of Pittsburgh. In July Pittsburgh made another advance to \$2.35, the last of August to \$2.60, and on September 6 to \$3; September 26 to \$3.40, November 8 to \$3.65, and December 20 to \$4.25. At Wheeling the changes in the card during the year were as follows. As already stated, early in the year the nominal card was \$2, though sales were made far below this. July 1, it advanced to \$2.10. August 1, it further advanced to \$2.15. August 11, it again advanced to \$2.25. August 22, another rise to \$2.35. September 1, still further to

\$2.60. September 9, again advanced to \$2.75. September 15, or in one week, to \$3. September 26, in two weeks, to \$3.40. November 10, the largest gap since July, to \$3.65. December 20, the largest advance of the year, to \$4.25.

METALLURGICAL NOTES.

KRUPP'S NEW DEPHOSPHORIZING PROCESS.

Herr Krupp, of Essen, appears to be very earnestly at work to solve the dephosphorization problem in his own way. He has recently patented in Germany a modification of his method, repeatedly referred to in the columns of *The Iron Age*. His new process is based upon the fact that pig iron, if melted together with oxides of iron, manganese and lime in a cupola lined with any basic material, is deprived of the greater part of its manganese, silicon, sulphur and phosphorus. The cupola is either lined with some basic or neutral material, like iron ore, bauxite, magnesite, coal, slate, or any carbonaceous material. Krupp is said to prefer, however, to dispense with the lining entirely, as far as the main body of the cupola is concerned, by water-jacketing it. He suggests a number of details as likely to prove of service, but does not appear to have settled upon any specified construction. The furnace can be made single or double—that is, one cupola can be placed above the other in such a manner as to deliver the melted product into a second one below it. In order to make the "washing" process as complete as possible, it is desirable to increase the height of the melting zone as much as possible by having two or more rows of tuyeres, one above the other. The pig is not decarbonized to any extent by being melted down in this manner, and it gets down to the hearth or forehearth of the furnace, as the case may be, in a fluid state. In order to prevent any decarbonization in the hearth, the latter may be lined with some carbonaceous material, or may be so constructed that the iron is separated from the slag by an automatic tap. The iron coming from the upper cupola runs into the lower one, into which fresh charges of coke and iron ore are put. The cinder from the lower cupola may also be used as the washing material for the upper furnace. Herr Krupp suggests that coke and ore might be charged mixed in the shape of *brquettes*, and as much less fuel is needed in the lower cupola, into which the pig is delivered in a fluid state, it can be made much narrower.

A series of trial meltings were made in an experimental furnace, about the construction of which nothing is given beyond the statement that it was small and imperfect, and was lined with graphite. The charges introduced weighed 1200 pounds, the iron containing:

Carbon.....	3.73	Copper.....	0.35
Silicon.....	0.47	Phosphorus.....	0.50
Manganese.....	3.56		

The ore used for washing held:

Oxide of iron.....	98.2	Phosphoric acid.....	0.54
Oxide of mang.....	0.1	Gangue.....	0.9
Lime.....	0.1	Moisture.....	0.2

The first charge, which filled the furnace partially, only yielded iron containing by analysis:

Carbon.....	3.40	Manganese.....	6.90
Silicon.....	0.002	Phosphorus.....	0.273

The second charge showed an improvement, the furnace being filled higher:

Carbon.....	3.03	Manganese.....	0.350
Silicon.....	0.001	Phosphorus.....	0.200

The following charges, which show the actual working of the furnace (as it was filled and the pig and ore travelled the whole distance under the action of the blast), yielded purified pig which was found by analysis to contain:

Carbon.....	3.00	Manganese.....	0.128
Silicon.....	0.004	Phosphorus.....	0.136

The action of a reduction of the height passed through by the ore is shown by the result of the last charges, which was:

Carbon.....	3.40	3.40
Silicon.....	0.002	0.002
Manganese.....	0.210	0.470
Phosphorus.....	0.187	0.210

The cinder which had absorbed the greatest amount of phosphorus was found to be composed as follows:

Silica.....	17.50
Protoxide of iron.....	41.28
Protoxide of manganese.....	26.30
Alumina.....	7.25
Lime.....	1.47
Magnesia.....	0.36
Phosphoric acid.....	5.28
Sulphur.....	0.66

The use of lime as a flux will permit a considerable reduction of the consumption of ore, as the silica from the coke will combine with it instead of attacking the ore. It is suggested that the liquid iron from the blast furnace might be made to pass through a furnace filled with a mixture of ore and coke, and be thus purified.

The metal obtained by the Krupp process is suitable for working in the open-hearth furnace, and is particularly well adapted for puddling, because the absence of manganese and silicon prevents a rapid wear of the furnace bottom. Whether this modification of what is really the Bell process will secure the economy of working which the well-known English iron master failed to obtain, is a question which operations on a large scale can only decide.

HOFMANN'S PROCESS FOR REFRACTORY AURIFEROUS SILVER ORES.

From a reprint of the second edition of Kuester's standard work, "Roasting of Silver Ores" in the *Mining and Scientific Press*, we take the following interesting data of O. Hofmann's combination of the Kipp and Patena leaching processes, especially designed to treat rich auriferous and argentiferous sulphurets. The process appears to have been used with much success to work the ores of the Colorado No. 2 mine, Alpine County, Cal., which is crushed and concentrated by Frue vanners until rich sulphurets, consisting of iron pyrites, silver glance, fahlore, ruby silver, galena and zinc blende are obtained. The average value of five months' run proves to be \$564 per ton, of which \$333.19 was silver and \$230.81 gold, the yield being 96 per cent. of silver and 95 per cent. of gold. The sulphurets are roasted with salt, preferably in an ordinary reverberatory, and the roasted material is

sifted and charged into leaching vats in quantities of from 2 1/2 to 3 tons, and leached with water to extract all soluble base chlorides. The water, if saturated with these base chlorides and some salt, of which generally some is left in the ore undecomposed after roasting, acts on the chloride of silver like a concentrated brine, dissolving the same. To prevent the escape of this dissolved part of silver, Hofmann does not admit the water from above the ore, as is usually done, but from below the filter bottom, which, by means of a slight pressure, is forced to ascend through the ore to the top of the vat. In this way the concentrated solution accumulates above the ore, and in diluting the same by a stream of water and permitting the solution to flow out through the filter bottom, the chloride of silver is precipitated on and through the ore, which is then extracted from the balance of the silver. This operation affects the fineness of the bullion somewhat if there is a considerable amount of lead in the ore, but not materially. The bullion of Colorado No. 2 has by this process a fineness of 957. The silver is then extracted in the usual manner, by the Kipp process, by leaching the ore with a solution of hyposulphite of lime, and precipitating the silver with polysulphide of calcium. The hyposulphite dissolves more or less gold, so that the bullion of Colorado No. 2 contains from two to ten thousandths of gold. The residue is then washed with water, and is removed to a kiln to reduce the amount of moisture, so as to make the ore suitable for the working of the succeeding processes. We would suggest that, perhaps, for this operation ordinary centrifugals, such as those used in sugar refineries, might prove of value. The desilvered ore, which still contains the bulk of the ore, is then treated with chlorine according to the Patena process, which Mr. Hofmann appears to have improved largely by alterations of details, into which the limits of our space do not permit us to enter. The gold is precipitated with sulphate of iron from the solution obtained by extraction with water, the precious metal being very fine, varying from 970 to 997 thousandths. We have referred at some length to Mr. Hofmann's method, because it shows what excellent results may be obtained by clever modification of known processes. It furnishes an example of how a thorough knowledge of the chemical principles underlying their action enables metallurgists to adapt themselves to varying circumstances.

THE THOMAS PROCESS IN GERMANY.

M. Paul Trasenter, a prominent Belgian metallurgist, gives some data on the experiments made in Germany with the Thomas process, in a review of its recent progress published in the *Revue Universelle des Mines*. According to the information received by him, it appears that four of the five converters at Hoerde are working with a basic lining, while the fifth is being prepared for it also, excellent results having been obtained with white highly-phosphoric pig. The mixture used is two-thirds of Hoerde mill pig and one-third Besse pig, the metal holding only 0.4 per cent. of silicon and 2.5 per cent. of phosphorus. The latter, it is claimed, generates the necessary heat during the conversion, while the low amount of silicon has made it possible to cut down the quantity of basic material added to 15 per cent., and to shorten the after-blow period considerably. The cinder, it is claimed, is basic almost from the outset, while the quantity of spiegel used is not greater than with pure pig. The waste, it is true, is 2 per cent. greater than formerly. A bottom will outlast 14 blows, while the charge of the converters and the number of blows have not decreased. A steel works contracting for pig recently specified a minimum of 2 per cent. of phosphorus, 1 per cent. of silicon and 0.2 per cent. of sulphur. M. Trasenter considered the sulphur question an important one, because pig low in silicon and low in sulphur can only be obtained with manganiferous ores. He says that 0.3 per cent. of sulphur can be tolerated if the Thomas process may be considered the solution of the great steel problem from a theoretical and practical, as well as a commercial, point of view. We may add that the Angleur steel works have been quite successful in converting a mixture composed principally of Luxemburg pig. Another account of the Hoerde experiments, which it is claimed comes from Herr Maasenez, the superintendent of the works, gives the following analyses of pig No. 1 and steel No. 2:

	No. 1.	No. 2.
Carbon.....	0.24	0.28
Phosphorus.....	0.06	0.04
Sulphur.....	0.10	0.07
Silicon.....	0.45	1.08
Manganese.....	1.04	1.37

In three charges 23,000 pounds of pig were added, together with 1380 pounds of spiegel, while the steel obtained weighed 20,525 pounds, and the cinder made amounted to 4960 pounds. While these results differ largely from those given by M. Trasenter, it does not follow that they are conflicting, as they may represent different stages of the development of the Thomas process at Hoerde.

J. Lloyd Haigh's Irregularities.

Mr. J. Lloyd Haigh, wire manufacturer, whose failure was announced in our last issue, is in very serious trouble. He has been arrested on complaint of the officers of the Grocers' Bank for forging an acceptance and raising money thereon. It is reported that Mr. Haigh's irregularities are very serious, and that other banks are scrutinizing the paper acceptances and warehouse receipts on which he has obtained money, though with what results we do not know. Mr. Haigh has been indicted by the grand jury for forgery in the third degree, pleaded not guilty before Judge Gildersleeve, and has been admitted to bail on two bonds of \$25,000 each.

Since the failure of Mr. Haigh it has been stated that there have been irregularities in his transactions, growing out of the East River Bridge steel wire contracts which are of a very serious nature. It is charged that a considerable quantity of wire, rejected because not coming up to the standard required by the contract, which calls for wire having a tensile strength of 160,000

lbs. to the square inch, has been substituted for accepted wire, thus unloading on the bridge a great deal of material which would otherwise have been unavailable for this purpose. As we have no personal knowledge of the facts of the case, we deem it only just to Mr. Haigh to say so. We copy the following from the *Sun*:

"In June, 1878, the engineers were surprised at the discovery that more wire had been delivered than the quantity of accepted wire then to be delivered amounted to, and this increased their vigilance. Col. Paine directed his assistants to keep their eyes wide open, and the result was the discovery that after Mr. Haigh's truck was loaded with coils of wire and weighed it was driven off apparently to go to the bridge yard, but instead it was taken by a circuitous route around to the shed where the rejected wire was stored. Here the good wire was unloaded and the defective wire was substituted. There was a pair of wagon scales in the shed on which the weight of the load was tried until it was the same as that of the discarded load. An employee of the bridge, looking through a crack in the fence, saw all this done, and saw the load of spurious wire start for the bridge. Col. Paine at once stopped the cable making and began calculations upon the amount of rejected wire that had thus been fraudulently substituted, and upon the amount that had found its way into the cables. These calculations were based upon the amount of wire that had been rejected, the amount of accepted wire already used, and the time of the deliveries, and, taking the extreme figures of his calculations, Col. Paine concluded that, to supply the strength of which the cables had been robbed, it would be necessary to add about 50 tons to the original quantity of wire introduced into the cables. He calculated that by increasing the standard of strength in this extra amount the loss of strength caused by the defective wire would be more than made up. The amount of wire added was not, however, the same as the amount of defective wire furnished. This defective wire amounted to about 150 tons. As soon as the fraud was discovered all of the wire in hand at the bridge was tested, and about 25 tons were rejected. This Mr. Haigh was forced to take back at his cost.

"The trustees, who were fully informed of the engineer's discoveries, were highly indignant. Some were in favor of exposing Mr. Haigh then, and others advocated refusing to pay him any money, thus forcing him to sue and prove that he had fulfilled his contract. The proceedings of the Board were all kept secret. A reporter for the *Sun* learned at the time that defective wire had been palmed off on the bridge, but as the engineers were reticent, and Mr. Haigh was full of smiles and plausible excuses, in which he alleged that a mistake had been made by some subordinates which he had promptly corrected, the facts were not satisfactorily obtained. Mr. Haigh was called before the Board, and he talked about caring more for his honor in the imputations of fraud than about any money involved, and expressed anxiety lest the gentlemen composing the Board should form a poor opinion of him. One trustee, wearied by his talk, said: 'Well, sir, do you want to know what we think of you?'

" 'I do, indeed,' said Mr. Haigh. 'That's what I am anxious about.'

" 'Well, sir,' was the reply, 'we think you are a d—d rascal.'

" 'Well,' said Mr. Haigh, wholly unabashed, 'do you know that is what I was afraid of—in fact, the only thing I was afraid of? Gentlemen, I am very sorry.'

"Mr. Haigh was at length compelled to furnish 50,000 pounds of wire free of charge, to take back 50,000 pounds of inferior wire which he had delivered at the yard, and to furnish 50,000 pounds more in its place in addition to that furnished under the contract, and for this last-mentioned amount he was paid the contract price. His account finally stood as follows:

Wire received to Sept. 1, 1878.....	Pounds.
Wire received during September.....	6,722,183
Wire rejected.....	299,182
Amount of wire deducted in settlement.....	580
Total amount of wire paid for.....	6,900,484

"The total amount paid to Mr. Haigh by the bridge trustees was \$615,096.20. Of this \$611,708.97 was paid under the contract, including the premium on gold in which he was paid; \$1849.22 for the 10 tons of sample wire furnished before the contract was begun, and \$790.17 interest on certificates, which were given him in lieu of money. Mr. Haigh's profit by the trick of substituting poor wire was much diminished after the compromise settlement made by the trustees. The whole amount of wire called for under the contract was 6,800,000 pounds, and as 6,900,844 pounds were required to complete the cables after the discovery of the fraud, there were only 100,000 pounds extra needed, of which he practically gave 50,000 pounds to the bridge, being paid about \$450 for the other 50,000 pounds. Even if he palmed off 150 tons, it is said, and all of this got into the cable, he did not make \$20,000; and from this estimate must be deducted the loss occasioned by the increased rejections."

We were unable, in conversation with a gentleman intimately acquainted with so much of Mr. Haigh's business as related to the steel wire contracts of the Brooklyn Bridge, referred to in the above, to obtain any information throwing light upon the alleged irregularities. It appears certain that only a small amount of wire was actually rejected by the engineers of the bridge, who subjected the material to severe tests. The records of these tests show that, as regards tensile strength, the wire delivered was on an average 25 per cent. stronger than the requirements of the specifications called for. The coiling test, it is true, was a more difficult one to comply with, and it is claimed that the manner in which it was often applied was such that it unfairly taxed the material.

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Middletown, Conn.

WANTED.

By a Foundry and Machine Shop, stocked with first-class workmen and good tools, some light articles, both in iron and wood, to manufacture. Prices moderate. Address: BOX 204, West Chester, Penn.

TO MANUFACTURERS OF AND DEALERS IN LOCKS AND GENERAL HARDWARE—Wanted, by a young man of 12 years' experience in the Hardware and Lock trades, and 12 years with one of the largest houses in New York, a position either as salesman, stock or shipping clerk. Not afraid to work. Best city references. Salary moderate. Address: LOCKS, Care A. H. Haverland, 259 Pearl St., New York.

Trade Report.

Office of The Iron Age, 83 Reade St., New York.

WEDNESDAY EVENING, JANUARY 7, 1880.

A feature of interest in the financial markets since our last issue has been the Treasury purchase of bonds for the Sinking Fund. On Saturday last the Treasury issued a circular inviting proposals for \$5,000,000 bonds, and limiting the price as follows:

Act of February 8, 1861—Sixes of 1880, at 102 3/4.
Act of March 2, 1861; July 17, 1861; and March 3, 1863—Sixes of 1881, at 104 1/4.
Act of July 14, 1870—Five per cents. of 1881, at 103 3/4.

At noon to-day proposals to sell to the Treasury were opened; the total of these was \$7,148,000; and all except \$303,000, which were offered at the Treasury limit, were below that limit. It is therefore a safe calculation that \$5,000,000 will be taken, and that the money paid for them will soon be transferred from the Treasury vaults to the reserves of the New York banks. The full amount of the gain to the banks will probably not show in next Saturday's bank statement, but the knowledge that the banks have gained the money ought to hasten the inevitable return to ease in the loan market. The only question at the time of writing is whether the Treasury will accept the entire offering or not.

In the money market 6 1/2 is the ruling rate on stocks, and 4 @ 5 is the quotation on United States bonds. There is little disposition to make time loans. Prime mercantile paper is 5 @ 6 1/2.

The stock market, after a season of quiet, has again developed some activity, with prices strong and higher. Government bonds are unchanged. Railroad investments, bonds and shares, are in demand at advancing prices. Speculative shares are all higher, and it is a question whether the large speculators who have been at work to keep prices from rising will much longer be able to check the general advancing tendency, which has the support of the investing as well as speculating public. Below we give the closing quotations of active shares and government bonds.

The bank return shows a gain of \$271,475 in surplus reserve, which now stands at \$271,475, against \$11,275,550 at this time last year, and \$9,324,125 at the corresponding period in 1878. The loans show a less this week of \$878,000; the specie is down \$356,100; the legal tenders are increased \$633,800; the deposits other than United States are up \$24,900, and the circulation is increased \$15,700.

The following is an analysis of the bank totals of this week compared with that of last week:

	Dec. 27.	Jan. 3.	Comparison.
Loans.....	\$277,534,200	\$276,700,200	Dec. \$838,000
Specie.....	48,638,200	45,282,100	Dec. 3,356,100
Legal Tenders.....	12,049,700	12,723,500	Dec. 673,800
Deposits.....	60,727,000	61,005,000	Dec. 278,000
Reserve required.....	60,515,500	60,521,775	Inc. 6,275
Surplus.....	519,350	483,800	Dec. 35,550
Circulation.....	21,732,900	21,748,600	Inc. 15,700

The foreign trade movements at the port of New York since our last issue are shown in the following tables:

For the week ended January 3:

Total for week: \$4,777,793 \$4,207,432 \$5,481,501

Included in the foregoing were items of merchandise valued as follows:

	Quantity.	Value.
Anvils.....	128	\$900
Brass goods.....	6	1,424
Bronzes.....	1	60
Chains and anchors.....	14	614
Copper.....	4	49,146
Cutlery.....	117	27,031
Gas fixtures.....	1	303
Guns.....	13	13,700
Hardware.....	14	530
Iron, hoop, tons.....	85	3,024
Iron, pig, tons.....	3,527	35,347
Iron sheet, tons.....	5	234
Railroad bars.....	3,514	28,626
Iron ore, tons.....	1,320	9,760
Iron, other, tons.....	1,511	17,187
Steel goods.....	17,497	1,427
Nails.....	86	7,680
Needles.....	1	110
Nickel.....	1	480
Old metal.....	8	1,154
Platina.....	1	30
Plated ware.....	1	730
Refrigeration caps.....	1	415
Saddlery.....	5	41,543
Steel.....	110,230	4,793
Spelter.....	1	885
Silverware.....	2	29,272
Tin, boxes.....	19,477	123,886
Tin, 5-bag shales.....	54	7,317
Wire.....	1	54

EXPORTS, EXCLUSIVE OF SPECIES.

For week ended January 6:

For the week: \$6,477,544 \$4,479,575 \$5,940,666

EXPORTS OF SPECIES.

Total for the week: \$3,820

Same time in 1879: \$43,749

Government bonds at the close were firm at the following quotations:

	Bid.	Asked.
U. S. 6's 1880 registered.....	102 1/2	102 3/4
U. S. 6's 1880 coupon.....	102 1/2	102 3/4
U. S. 6's 1881 registered.....	102 1/2	102 3/4
U. S. 6's 1881 coupon.....	102 1/2	102 3/4
U. S. 5's 1881 registered.....	102 1/2	102 3/4
U. S. 5's 1881 coupon.....	102 1/2	102 3/4
U. S. 4 1/2's 1881 registered.....	102 1/2	102 3/4
U. S. 4 1/2's 1881 coupon.....	102 1/2	102 3/4
U. S. 4's 1897 registered.....	102 1/2	102 3/4
U. S. 4's 1897 coupon.....	102 1/2	102 3/4
U. S. Currency 6's 1893.....	102 1/2	102 3/4
U. S. Currency 6's 1897.....	102 1/2	102 3/4
U. S. Currency 6's 1899.....	102 1/2	102 3/4
U. S. Currency 6's 1899.....	102 1/2	102 3/4

The following were the closing quotations of active shares:

	Bid.	Asked.
Alton and Terre Haute.....	20	21
American District Telegraph.....	45	45 1/2
Atlantic and Pacific Telegraph.....	71	72 1/2
Burlington and Quincy.....	46 1/2	47 1/2
Canada Southern.....	69 1/2	70 1/2
Cent. Arizona.....	21	21 1/2
Canton.....	59	60
Caribou.....	21	21 1/2
Col. Col. and Indiana Central.....	21	21 1/2
Clev. Col. and Indianapolis.....	70	71
Chicago, St. Paul and Minn.....	48 1/2	49 1/2
Chicago and Alton.....	150	151
Chesapeake and Ohio.....	19 1/2	19 3/4
Delaware, Lack. and Western.....	39 1/2	40 1/2
Delaware and Hudson Canal.....	8 1/2	8 3/4
Express-Adams.....	102	103
United States.....	48	49 1/2
Wells, Fargo & Co.....	101 1/2	102 1/2

Erie.....	42 1/2	43
Excelsior Mining.....	25 1/2	26
Harlem.....	160	161
Hannibal and St. Joseph.....	35 1/2	36
Houston and Texas.....	57 1/2	58
Illinois Central.....	100 1/2	101 1/2
Ind., Cincinnati and Lafayette.....	4 1/2	4 3/4
Kansas Pacific.....	87 1/2	88 1/2
Kansas and Texas.....	30 1/2	31 1/2
Keokuk and Des Moines.....	16	17 1/2
Lake Erie and Western.....	99 1/2	100 1/2
Leadville.....	20 1/2	21 1/2
Little Pittsburgh.....	4 1/2	4 3/4
La Platte.....	3 1/2	3 3/4
Louisville and Nashville.....	86 1/2	87 1/2
Marietta and Cincinnati Preferred.....	14 1/2	15 1/2
Marietta and Cincinnati.....	10 1/2	11 1/2
Metropolitan Elevated.....	117	118
Michigan Central.....	89 1/2	90 1/2
Morris and Essex.....	120 1/2	121 1/2
Mobile and Ohio.....	102 1/2	103 1/2
Manhattan Railway.....	50 1/2	51 1/2
Nashville and Chattanooga.....	80 1/2	81 1/2
New York Central.....	132 1/2	133 1/2
New York Elevated.....	120 1/2	121 1/2
New Jersey Central.....	81 1/2	82 1/2
New Central Coal.....	32 1/2	33 1/2
Northwestern.....	91 1/2	92 1/2
Northern Pacific.....	100 1/2	101 1/2
Ohio and Mississippi.....	56 1/2	57 1/2
Ontario Silver.....	58	59
Pacific Mail.....	39	40
Panama.....	172	173
Quicksilver.....	20	21
Rock Island and Pacific.....	71 1/2	72 1/2
St. Louis and Iron Mountain.....	54 1/2	55 1/2
St. Louis and San Francisco.....	43 1/2	44 1/2
St. Paul.....	71 1/2	72 1/2
St. Paul and Sioux City.....	38 1/2	39 1/2
Standard.....	75 1/2	76 1/2
Sutro Tunnel.....	3 1/2	3 3/4
Union Pacific.....	80	81
Wabash and Pacific.....	41 1/2	42 1/2
Western Union Telegraph.....	100 1/2	101 1/2
Climax Mining.....	3 1/2	3 3/4

GENERAL HARDWARE.

The new year has opened propitiously, and we have to report the unusual spectacle of an active market in midwinter, occasioned in a great measure by the rising tendency in values of all classes of Hardware. The amount of business done during December is stated by some of our city houses to be in excess of the business of October last, a month generally conceded to be one of the most active of the year, and the indications for a still larger business this month are favorable. As will be seen by our reports of the iron markets of the country, the value of this important staple is still tending upward.

Foreign Hardware, heavy goods especially, shows an upward tendency, and German Halter and Coil Chains have been again advanced by the importers. The Wiebusch & Hilger Hardware Company received a cablegram from Peter Wright & Sons, announcing a further advance of 1/2 per cent. on P. W. Anvils. The price here has advanced 1/4 cent per lb., and we quote regular sizes, 10 1/2 cents, and Anvils over 250 lbs., 11 1/4 cents per lb. Hermann Boker & Co. have also advanced their "Treutons" Anvils to 10 1/2 cents per lb.

The demand for Nails is fair for this time of the year, and the market is firm at the advance mentioned in our last issue. A rumor to-day that the card rate had been advanced to 85 in Pittsburgh caused quite a breeze in the trade, and was generally believed. It is, however, disposed of in the following telegram to The Iron Age, dated Pittsburgh, January 7, 1880: "The report that Nails had advanced in Pittsburgh to five dollar card is not correct." We quote on a strong market, rod, to 60d., \$4.35, net, for lots less than 200 kegs; for 200 kegs and over, \$4.25 per keg, net.

The following manufacturers of Locks, Knobs, Escutcheons, Keys, &c., have announced, under date of 6th inst., a further advance on list of December 15, 1879, and now quote discount 33 1/2 per cent:

RUSSELL & ERWIN MFG. CO.,
MALLORY, WHEELER & CO.,
P. & F. CORBIN,
READING HARDWARE CO.,
BRANFORD LOCK WORKS,
TRENTON LOCK CO.,
NASHUA LOCK CO.,
PARKER & WHIPPLE,
NORWALK LOCK CO.,
NORWICH LOCK CO.,
JACOBUS & NEMICK MFG. CO.

In our last issue we reported an advance in the price of Locks, Knobs, &c., to discount 45 per cent., not being then aware that there was besides a 10 per cent. discount, which the makers had agreed to keep quiet. We are assured that in the present case there is nothing held back, 33 1/2 being the whole discount.

Landers, Frary & Clark have their Discount Sheet No. 7 in press. The principal changes are:

Brass Cocks, revised list..... 33 1/2 & 10 Stebbins' Pattern Moirasse Gates..... 50 & 10 Spring Balances..... 2 1/2 & 2 1/2 Excelsior Steelyards..... 30 Family Scales..... 30

Sargent & Co. have advanced the price of Plate Hinges and Hook Hinges as follows:

No. 160, Fast Joint Plate Hinges.
6, 8, 10 and 12 inches, per 100 lbs..... \$8.75
14 inches and larger..... 7.50
No. 162, Loose Joint Plate Hinges.
6, 8, 10 and 12 inches, per 100 lbs..... \$8.75
14 inches and larger..... 7.50

No. 166, Hook Hinges.
8, 10 and 12 inches, per 100 lbs..... \$8.75
14 inches and larger..... 7.50
No. 168, Hook Hinges.
8, 10 and 12 inches, per 100 lbs..... \$8.75
14 inches and larger..... 7.50

Ten per cent. discount for prompt cash.
The Underhill Edge Tool Co., Fernald & Sise, agents, have announced advances in their prices as follows:

NASHUA, N. H., Jan. 1, 1880.

Owing to the continued advance in material and labor, we have changed our discount on Hatchets, Broad Axes, Adzes, &c.,

to 25 per cent. Chisels, Cleavers and miscellaneous goods, 20 per cent. Underhill and Amoskeag Axes, first quality, Light, \$9 per dozen, net. Double Bit Axes, \$17 per dozen, net. Bush Hooks Handled, Strapped Eye, \$10.50 per dozen.

The American Copper Rivet Association have advanced the price of Copper Rivets and Burrs to discount 25 per cent. The list remains as before. This price went into effect on the 1st inst.

On the 1st instant the manufacturers of Cabinet Locks advanced their prices to discount 10 per cent. from list. An extra discount of 2 per cent. for cash in 30 days is allowed.

The Millers Falls Co. have issued the following circular:

No. 74 CHAMBERS STREET,
NEW YORK, January 1st, 1880.

Owing to the great advance in Iron and labor, we are compelled to reduce the discount on our Vises 10 per cent., keeping the list price the same.

We shall make no more of the cheaper grades of Lester Saws, but hereafter all of these Saws will be heavily Nickel-plated, with large, solid Emery Wheels, and all other improvements which we have ever used.

The list price of the Lester Saw, until further notice, will be \$10; this is 50 cents less than the same grade has sold at hitherto. The \$8 Lester we shall not make.

The price of Nickel-plated Rogers Saws, with large, solid emery wheels, drilling attachment, Nickel-plated blower, &c., will be \$4.

Our regular Rogers Saw, with Japan finish and large iron balance wheel, drilling attachment, blower, &c., we shall designate as No. 1, and list at \$3.50. The Nickel-plated Rogers Saw, listed at \$4, we shall call Rogers No. 2.

We shall make Saws of standard quality which will never fail to give satisfaction, and shall not try to compete with lower grade goods.

We have raised the List Price of our Family Grindstone to \$3.50.

Our new Catalogue, with Discount Sheet, will be sent to you before the end of this month.

MILLERS FALLS CO.

The manufacturers of Augers and Bits held a meeting in this city to-day, at which the list for these goods was revised. We print below their joint circular, new list and discounts:

CIRCULAR.

At a meeting of the Auger and Bit manufacturers, held at the Astor House, New York, Jan. 7, 1880, the undersigned adopted the following lists and discounts, to take effect on that date:

DOUGLASS MFG. CO.,

Russell & Erwin Mfg. Co., sole agents.

W. A. IVES & CO.,

ELMIRA NOBLE MFG. CO.,

CONNECTICUT VALLEY MFG. CO.,

C. L. GRISWOLD,

SNELL MFG. CO.,

C. E. JENNINGS & CO.,

FRENCH, SWIFT & CO.,

HUMPHREYSVILLE MFG. CO.

Cast Steel Auger Bits.

16ths inch..... 3 4 5 6 7 8 9

Per doz..... \$3.50 3.00 3.00 3.25 3.50 3.50 4.00

14ths inch..... 10 11 12 13 14 15

Per doz..... \$4.50 5.00 5.50 6.00 6.50 7.25

12ths inch..... 16 17 18 19 20 21 22 23 24 25

Per doz..... \$3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00 3.00

In sets..... \$1.25 1.25 1.25 1.25 1.25 1.25 1.25 1.25 1.25 1.25

Nut Augers.

Inch..... 1/2 3/4 1 1 1/4 1 1/2 1 3/4 2

Per doz..... \$5.50 6.50 8.00 8.50 9.50 10.50 10.50

Inch..... 2 2 1/2 3 3 1/2 4 4 1/2 5

Per doz..... \$11.50 14.00 17.00 20.00 24.00 28.00 30.00

Inch..... 6 8 10 12 14

*Narrow Butts, No. 800.....	40x10
*Loose Joint Butts, No. 802.....	50x10
*Reversible Butts, No. 804.....	50x10
*Loose Joint Butts, No. 806.....	50x10
*Broad Butts, No. 808.....	40x10
*Table No. 810.....	40x10
*Inside Blind Butts, No. 812.....	40x10
*Back Flaps, Nos. 814, 816.....	40x10
*Pow. Door Butts, No. 818.....	40x10
*Chest Hinges, No. 820.....	40x10
*Reversible Butts, Steeple Tips, No. 822.....	40x10
*French Pattern, No. 824.....	40x10
*Extra Light Butts, No. 826.....	40x10
*Parliament Butts, Steeple Tips, No. 828.....	40x10
*Nos. 830, 832.....	40x10
*Light Reversible Butts, No. 834.....	40x10
*Loose Joint Butts, No. 836.....	40x10
*Narrow Butts, No. 838.....	40x10
*Inside Blind Butts, No. 840.....	40x10
*Loose Joint Butts, No. 842.....	40x10
*Edge Holes, No. 844.....	40x10
*846.....	40x10
*Light Inside Shutter Butts, No. 848.....	40x10
*Light and Heavy Strap Hinges, Nos. 850, 852.....	35x10
*Light, Heavy, and Extra Heavy Hinges, Nos. 854, 856, 858.....	35x10
*Long Chest Hinges, No. 860.....	35x10
*Crate Hinges, Nos. 862, 864.....	35x10
*Patent T Hinges, Nos. 866, 868.....	35x10
*Bulk Shutter and Flank Hinges, Nos. 870, 872, 874.....	35x10
*Croquet Hinges, Nos. 876, 878.....	35x10
*Rolled Plate and Rolled Raised Hinges, Nos. 880, 882.....	35x10
*Rolled Plate and Raised Blind Hinges, Nos. 884, 886.....	35x10
*Norwich Blind Hinges, Nos. 888, 890.....	35x10
*Japanned Strap and T Hinges, Nos. 892, 894.....	35x10
*Hinges and Staples, Nos. 896, 898.....	50x10
*Wrought Hinges, Nos. 900, 902.....	50x10
*Hinges and Staples, Nos. 904, 906.....	50x10
*Japanned Hinges and Staples, Nos. 908, 910.....	50x10
*Step Ladder Hinges, No. 912.....	50x10
*Washers, No. 914.....	6 1/2 cts. per lb.
*Corner Irons, No. 916.....	45
*Carpet Hammer, No. 918.....	45
*Flush Bolts, with Knobs and Slides, Nos. 1000, 1002, 1004, 1006.....	40x10
*Flush Bolts, with Knobs and Slides, Nos. 1008, 1010, 1012, 1014.....	40x10
*Extra Heavy Flush Bolts, Brass Knobs, Nos. 1016, 1018.....	40x10
*Flush Bolts, Brass Knobs, Nos. 1020, 1022.....	40x10
*New York City Flank Flush Bolts, No. 1024.....	40x10
*Sunk Flush Bolts, Polished Plates, Nos. 1028, 1030.....	40x10
*Sunk Flush Bolts, Nos. 1032, 1034.....	40x10
*Sunk Flush Bolts, Nos. 1036, 1038.....	40x10
*Projecting Flush Bolts, Nos. 1040, 1042, 1044.....	40x10
*Southern Door Bolts, Nos. 1046, 1048.....	40x10
*Flat Tail Bolts, No. 1050.....	40x10
*Flat Spring Bolts, Nos. 1052, 1054.....	40x10
*Chain Bolts, No. 1056.....	40x10
*Canada Bolts, Nos. 1058, 1060.....	40x10
*Barrel Bolts, Nos. 1062, 1064.....	40x10
*Square Bolts, Nos. 1066, 1068.....	40x10
*Round and Square Neck Bolts, Nos. 1100, 1102.....	40x10
*Tower Bolts, Nos. 1104, 1106.....	40x10
*Brass Barrel Bolts, No. 1108.....	40x10
*Japanned Shutter Bolts, Polished Bolt, No. 1110.....	40x10
*Japanned Shutter Bolts, Galvanized Bolt, No. 1112.....	40x10
*Case Shutter Bolts, No. 1114.....	40x10
*Steamboat Shutter Bolts, Nos. 1116, 1118.....	40x10
*Wrought Iron Floor Plates for Wrought Square Bolts, Nos. 1120, 1122.....	40x10
*Wrought Iron Floor Plates for Wrought Square Bolts, Nos. 1124, 1126.....	40x10
*Cast Iron Plates for Square Bolts, No. 1128.....	40x10
*Window Shutter Handles, No. 1200.....	60
*Coffin Handles, No. 1202.....	60
*Lifting Handles, No. 1204.....	60
*Japanned Chest Handles, "Stanley Works" No. 1206.....	add 10
*Japanned Chest Handles, "Seeborn" No. 1208.....	add 5
*Japanned Chest Handles, "Patent" No. 1210.....	add 5
*Japanned Chest Handles, "Patent" No. 1212.....	add 5
*Japanned Chest Handles, "Patent" No. 1214.....	add 5
*Japanned Chest Handles, "Patent" No. 1216.....	add 5
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*Japanned Chest Handles, "Patent" No. 1252.....	add 5
*Japanned Chest Handles, "Patent" No. 1254.....	add 5
*Japanned Chest Handles, "Patent" No. 1256.....	add 5
*Japanned Chest Handles, "Patent" No. 1258.....	add 5
*Japanned Chest Handles, "Patent" No. 1260.....	add 5
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*Japanned Chest Handles, "Patent" No. 1290.....	add 5
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*Japanned Chest Handles, "Patent" No. 1306.....	add 5
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*Japanned Chest Handles, "Patent" No. 1380.....	add 5
*Japanned Chest Handles, "Patent" No. 1382.....	add 5
*Japanned Chest Handles, "Patent" No. 1384.....	add 5
*Japanned Chest Handles, "Patent" No. 1386.....	add 5
*Japanned Chest Handles, "Patent" No. 1388.....	add 5
*Japanned Chest Handles, "Patent" No. 1390.....	add 5
*Japanned Chest Handles, "Patent" No. 1392.....	add 5
*Japanned Chest Handles, "Patent" No. 1394.....	add 5
*Japanned Chest Handles, "Patent" No. 1396.....	add 5
*Japanned Chest Handles, "Patent" No. 1398.....	add 5
*Japanned Chest Handles, "Patent" No. 1400.....	add 5

BRITISH IRON MARKET.

[Special Report by Cable to The Iron Age.]
LONDON, Wednesday, Jan. 7, 1879.

Scotch Pig.—The demand is increasing and a large business has been done. Prices have advanced materially during the week, the present quotations being:

Gartsherrie..... 80/0
Coltness..... 80/0
Eglington..... 80/0
Glengarnock..... 80/0

Manufactured Iron.—Is steady and prices firm. A very fair business has been done. Best Staffordshire Bars are quoted 80.

Rails.—Are in heavy demand and prices advancing. Welsh are quoted at £7. 10/ to £8. 5/.

IRON.

American Pig.—There is considerable inquiry for iron, and if some of the makers whose brands are in most request in this market were in a position to accept further orders, there is no doubt that some heavy transactions would be included in the week's business. As it is, we are not able to trace any large sales since our last writing, although we are aware of heavy contracts being declined simply because the company to whom it was offered were too largely sold ahead. We hear rumors of transactions in Foundry Iron on the basis of \$38 for No. 1, but are unable to verify them. The tendency of prices, however, seems to be still upward, and it only needs a little more impetus to the demand to start prices. In the present condition of the market we can only quote nominally, viz.: Foundry No. 1, \$35 to \$37; Foundry No. 2, \$33 to \$35; Gray Forge, \$33 to \$35.

Scotch Pig.—The demand for Scotch iron during the week has not been active, and the only transaction that has come to our notice worthy of mention is a sale of 500 tons Summerlee to arrive. Prices here, under the influence of dispatches from Glasgow, which are all of a buoyant nature, are tending upward, and we quote the market firm at the following figures: Eglington, \$28.50 to \$29; Coltness, \$32; Glengarnock, \$30; Gartsherrie, \$30, and Summerlee, \$29.

@ \$30. The imports of foreign iron during the week amount to about 2500 tons.

Rails.—We hear of sales in lots, aggregating between 6000 and 7000 tons Steel Rails, at various prices, some said to be as high as \$77 at tidewater. In iron rails no new business is reported, and we nominally quote English iron rails, \$53 @ \$55; American, \$54 @ \$58, and steel, \$75.

Old Rails.—The market, so far at least as old rails are concerned, has been in a very excited condition during the week, and all sorts of fancy prices are named, and in some instances have been paid, for prime lots. We have heard of a lot of Double Heads being offered at \$40, and afterward retired from the market for a higher figure; and there are many who say they will not have to wait long before purchasers will be found willing to pay \$42. Sales on private terms, mostly to arrive, are reported that will aggregate 25,000 tons. Arrivals during the week have been large. It will be seen from the foregoing that it is a difficult matter to quote the market accurately. Holders' views, as nearly as can be reported, are for T's, \$36 @ \$38; and for Double Heads, \$38 @ \$40.

Scrap.—Sales are reported of about 300 tons No. 1 Wrought. We quote the same from yard, \$36. Arrivals since our last writing, 2500 tons.

Manufactured Iron.—The demand for bars is, considering the season, active, and the mills all over the country are well provided with orders. Store prices here are the same as quoted last week, viz.: 3.2 for Common and 3.7 for Refined Bars, but buyers of large lots could shade these figures. The quantity of foreign bars arriving here is very large, and some of it is said to be of excellent quality, and is laid down, even at the late advance of 20/ a ton in England, at less than American mills are willing to supply the same grade. There seems to be no apprehension, however, that this influx of foreign iron will have the effect of displacing the domestic article, as the present capacity of the country seems wholly inadequate to the demands at present made upon it. The number of bars noted in the imports for the week ending January 6 is 41,034, and of Bundles, 1810.

METALS.

Copper.—The first week of the New Year has opened with a better demand, leading to purchases of some 250,000 pounds Lake Superior at 21 1/2¢ @ 21 3/4¢ on the spot, and of 500,000 pounds deliverable in February, March and April at 22¢. Baltimore is worth nominally as much. No change has occurred in England. From the West Coast intelligence has reached us via Panama that revolutions have taken place both in Peru and Bolivia, the presidents of both these belligerent States having fled. Their successors are supposed not to be anxious to continue a disastrous struggle. There is some prospect, therefore, of the war approaching its termination speedily. The manufacturers of copper, except rivets, are unaltered, New Sheathing being worth 25¢; Braziers and Bolts, 30¢; Rivets are now worth 25¢.

Tin.—Our market remained unchanged until a day or two ago, when prices began to harden, as was generally anticipated, and we now quote spot Straits 21 1/2¢ @ 22¢; English Common, 21¢ @ 21 1/2¢, and Banca 24¢, all large lines. At the price of Straits noted several sales have been made, both on the spot and afloat. Although the stocks and the visible supply are ample, higher values are confidently looked forward to. London fluctuates between £92 @ £93 for Straits, while Singapore has advanced to \$23 per picul. The deliveries in England and Holland last month were 1500 tons. The receipts during the past fortnight were considerable, say 13,500 slabs Straits, 2328 Ingots Australian and a small quantity of English. The stock in New York and Boston, on January 1, 1879, was 700 tons, since when there has been a supply from the Straits of 6300 and of Straits from London of 3000—together, 6600 tons; of Billiton, 1000; Australian, 800; Banca, 100; and English, 1500—together, 10,000 tons of all sorts, making a total supply of 10,700 tons. The American consumption may be set down at 8000, leaving a stock on Jan. 1, 1880, of 2700 tons. There were afloat on Jan. 1, 1880, 1900 tons Straits, 1000 tons Billiton, and 200 tons Australian—together 3100 tons; the entire visible supply on Jan. 1, 1880, was consequently 5800 tons. The Straits Settlements have shipped to the United States in all 1879 122,740 piculs, against 68,731 in 1878, showing an increase last year of 54,009 piculs. There were afloat Jan. 1, 1880, from the same quarter, for this country, 32,186 piculs, or 43,000 slabs, against 24,000 on January 1, 1879. The Tin Plate market has been very strong here. On the other side it has been wild, 28/6 having been paid there for Coke Tin yesterday. The rise has been due in England both to the improvement in raw material—Hematite Pig commanding £110—and to the increase in the rate of wages. Furthermore, "other countries are coming forward with a more active demand. We quote at the close: Charcoal Bright, \$9 @ \$9.25; ditto Ternes, \$7.75 @ \$8.25; Coke Tin, \$7.50 @ \$7.62 1/2; and ditto Ternes, \$7 @ \$7.25.

Lead.—Lead is considerably stronger after sales of some 150 tons Common Domestic on the spot at 5 1/2¢ @ 5 3/4¢, and of 2000 tons at 5 1/2¢ @ 5 3/4¢, to arrive in January, February and March. Refined is nominally worth 6¢. The market closes firm at the outside rates. The sales made have cleared our market of all cheap lead. Some Spanish and English are dropping in the meantime. Of the latter there are to arrive altogether some 1000 tons. The cable informs us that English Pig has advanced to £19. 5/ in the London market. Manufacturers' prices remain as last noted. We quote: Bar, 6 1/2¢; Pipe, 7 1/2¢; Sheet, 6¢; Tin-lined Pipe, 15¢, all less 10¢ to the trade. No. 1 Solder, 12¢.

Spelter and Zinc.—A weak state of affairs has continued to prevail, and Western has sold in small lots at 6¢, while Silesian commands, as to brand, 6 1/2¢ @ 6 3/4¢. Sheet Zinc may be quoted 8¢ @ 8 1/4¢, nominally.

Nickel.—A moderate demand is observable at \$1.40 for prime American.

Antimony.—One continues scarce in England and the tendency remains an upward one. The stock of Cookson here is quite small. We quote the metal strong at 17¢ @ 20¢.

COAL.

There has been a pretty generally expressed feeling in the trade that after New Year's there would be an increased activity. New Year's Day came and went, but it did not bring with it any marked or even perceptible improvement. The production for the year has been enormous, and of this there is the merest fraction in the hands of the producers. The whole amount may be said to be consumed or in the hands of the consumers. There seems to be very little doubt that the quantity of coal mined the past year is largely in excess of the wants of the country. The result of this is a dull market, especially as the companies are talking of raising the price, and are actually quoting advances of 25¢ or more. With an abundance of coal in stock, people do not readily enter the market and pay an advanced price. Mining operations at the present time are nearly at a standstill. Repairs at mines, scarcity of cars and the various necessities of mining make stoppages necessary.

The tonnage reports for the past year are exceedingly interesting, and, in some respects, surprising. Mr. Frederick E. Saward computes the tonnage of Anthracite for the year 1879 at 25,665,621 tons, taking the greatest care not to "double up" any report, and to give everything that comes to tide-water. This does not include the last three days of the year. These he estimates will bring the figures up to 25,800,000 tons. In the early part of November, Mr. Saward estimated that the output for the year would be 25,500,000 tons. The mild winter, and the extraordinary output which was maintained until the very close of the season, caused the tonnage to exceed the estimate by about 10 per cent. Mr. R. P. Rotherwell, however, in summarizing the prospects of the trade during the past year, states the output of Anthracite at 27,825,000 tons. He estimates the amount of coal which reached tide-water at 26,250,000 tons, a figure very close to that which we have already given. Even the smallest of these figures indicates a very large overproduction.

As we have noticed, prices are nominally advanced; the Philadelphia and Reading's last circular quotes Stove at \$4.25, f. o. b. at Elizabethport. Wyoming coals are nominally as per circulars, &c., at from \$3.75 @ \$4. Practically such quotations as \$3.50 are given in the offices when any one asks in regard to coal. We have indirectly heard of sales at \$2.90, \$3 and \$3.10. With quotations and actual selling prices so far apart, the dealer may well consider the outlook somewhat dark. Many operators are working extensively on large sizes to supply their line trade, and are making as small amounts as possible of the prepared sizes.

EXPORTS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending January 6, 1880:

Hamburg.	
Quant. Val.	
Pldware, cs., 88	18,913
Hdw., cs., 18	778
Mach. oil, bbls., 175	15
Ag. imp. pkgs., 13	825
Tinware, cs., 11	365
Rifles, case, 1	80
Wringers, cs., 8	372
Mf. iron, pkgs., 18	951
Sew. mach., cs., 515	7,804
Glassware, cs., 3	10
Gas flxt., cs., 3	10
Lub. oil, bbls., 50	300
Mach'y, cs., 43	3,665
Beltng, cs., 1	375

Danish West Indies.	
Nails, kegs, 18	77
Hdw., cs., 1	78
Mf. iron, pkgs., 21	166
Boiler tubes, 35	139

Bremen.	
Pldm., gals., 1,124,170	85,857
Mf. iron, pkgs., 6	110
Tinware, cs., 4	330
Windmills, pkgs., 20	260
Hdw., cs., 44	1,305
Ag. imp. pkgs., 28	1,075
Iron rolls, cs., 3	350

Dutch West Indies.	
Mach'y, cs., 2	132
Pldm., gals., 500	66

Dutch East Indies.	
Pldm., gals., 299,626	36,059

Amsterdam.	
Pldm., gals., 305,000	74,350

Rotterdam.	
Hdw., cs., 19	449
Brass gds., cs., 1	490
Ag. imp. pkgs., 20	1,100
Lub. oil, bbls., 150	1,850

Antwerp.	
Pldm., gals., 865,076	64,422

Imp., pkgs.	20	1,100	Glassware, cs.	100	1,363
Lub. oil, bbls.	150	1,800	Tinware, cs.	4	66
Antwerp.			Pumps, pkgs.	3	130
Im., gals.	865,076	64,422	Ptim., gals.	2200	285
			Pltdware, cs.	1	50

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busier, and there are many indications pointing to a very marked extension of production thereabouts between now and May next. The plate mills are especially well engaged, owing to the briskness of the shipbuilding yards. The same cause affords ample employment to the marine engineers, nut and bolt makers, and a variety of other manufacturers. The Cleveland smelters are rather nettled at the somewhat hostile reception accorded to some of their pig iron on your side of the Atlantic, and they assert that the shortcomings alleged have no existence in fact. Cleveland pig of any reputable brand is not cold-short, although it may at first seem to be so by strange users. Even in this country a similar deficiency was at one time attributed to it, but that has long since been regarded as being erroneous. The Cleveland people who made the original shipments to Boston, U. S. A., bring forward proof of the good quality of the iron in the shape of repeat orders, the filling of which will shortly bring additional consignments into the United States. At the present time Cleveland G. M. B. at Middleboro' are quoted f. o. b. in Tees:

| | | | |
|--------------------|------|--------------------|------|
| No. 2 Foundry..... | 53/6 | Notified..... | 48/ |
| 3 "..... | 54/ | White..... | 46/6 |
| 4 "..... | 48/6 | Refined metal..... | 67/6 |
| No. 4 Forge..... | 48/6 | Kentledge..... | 55/ |

As regards the

MANUFACTURED IRON TRADE
the usual quarterly returns of the accountant to the Northern Board of Arbitration have just been issued. The average net selling prices he certifies to have been £5. 5/7, and gives the following particulars:
Sales During the Three Months ending November 30, 1879.

| Description. | Weight invoiced. | Per ct. of total. | Average net price per ton. |
|--------------|----------------------|-------------------|----------------------------|
| Rails..... | Tons, Cwt, Qrs, Lbs. | | £ s. d. |
| Plates..... | 2,557 0 2 11 | 3.13 | 4 18 3.39 |
| Bars..... | 41,524 18 0 13 | 57.53 | 5 5 4.52 |
| Angles..... | 16,157 8 9 18 | 22.38 | 5 11 0.16 |
| | 12,244 9 3 4 | 16.96 | 5 0 5.74 |
| Total..... | 72,483 27 0 8 | 100.00 | 5 5 2.85 |

THE RISE IN PRICES
to which I made allusion at some length in my last week's letter is still in progress, and so far as one can judge from the "outward and visible signs," there is no limit which may not be reached and passed by the leaders of the movement. This is the most noticeable in respect of iron, and especially in the South Staffordshire district. When I last wrote it was generally rumored that the rise to be declared on the quarter days in marked iron prices would be 20 per cent, and firms were cited as being willing to book orders subject to that advance, by which the list quotations will be brought up to £9 per ton. During the week the reports under this head have taken a more decided color, and we are now most confidently assured that the new price for marked bars will be £10, or a rise of £2 over the present nominal figures. Did these rumors merely rest upon the slender authority of those "irresponsible persons," &c., who write on trade matters for the daily papers, one might pass the matter off with an incredulous smile as a joke of the period. Unfortunately, such is not the case. I have had personal assurances as to the probability of the new increment, and as I write I have before me the newly-printed circulars of several good houses in which pointed reference is made to the matter. One such firm (Messrs. T. W. & J. Walker, of London, Wolverhampton, &c.) say: "Iron seems to advance 10 a week, and nearly all the works are full of orders. Prices are very irregular." Messrs. Brooker, Dore & Co., of London, who do the export business of E. F. & W. Baldwin, the Blackwell Galvanized Iron Company, &c., say: "As regards marked bars, no further official rise has been made, but the list houses refuse to sell under £9 at the works. We quote, therefore, nominally, at £9 15/ delivered London. An opinion is gaining ground that on quarter day next prices will be advanced £2 per ton, which would make bars £10 at works." On the Birmingham "change," last week, holders of second-class and ordinary unmarked finished iron were even more clamorous than the producers of best brands, and what is more, they were largely successful in converting buyers to their views. They secured from £7. 15/ to £8. 5/ for ordinary bars; £9 for hoops, and £10 to £10. 10/ for 20 W. G. sheets, while 24 W. G. sheets fetched £11. 10/, and lattens, or 27 W. G., £13 for lots to be delivered during the next three months, in many cases also subject to the proviso that prices shall be those current at the time of delivery! Even at these figures sellers are reported to have had the upper hand to such an extent that they rejected offers for large lots. This is a difference with a vengeance from the state of affairs three months, or even two months, ago! At the same time there is a strong impression that a very important proportion of this simply consists of speculative buying by merchants, and of equally speculative "jumps" by producers. Between the two, legitimate traders are certain to suffer to no inconsiderable extent, and the consumptive wants of the market will be thrown back. Even now we are in possession of evidence showing the confusion and uncertainty generated by the spasmodic action of the trade. This comes in our latest reports from Australia. At Melbourne, on November 1st, it is stated that telegraphic advices of the changes in England had come to hand, and holders had at once put up their prices, but the state of the market there was such that in scarcely any instance had the full increments been secured. Pig iron had been so enhanced as to stop all but urgent trade sales. Galvanized iron, which had then risen £2 in England, had been advanced 10/, but only 5/ more could be secured. This was the rule throughout, and shows very plainly that these important markets cannot possibly bear further imposts. At home, too, this remark has scarcely less truth, for it is clear to most people that the wants of consumers are relatively small, and that their requirements certainly do not warrant these continuous upward fluctuations. Other changes of the week have been these: A reduction of £2 in Cornish tin standards, making superior common 82/ and superior line 83/ per cwt., an advance on iron beds of 15, and on brass and composite of

10%; rises in iron wire of 10/ per ton, making plain 0 to 6, 10/6; best ditto, 11/ @ 24/6; galvanizing, 3/6 extra; best drawn fencing wire, annealed, £10 @ £13; prepared bright, £11 @ £14, and galvanized, £13/5 @ £18; a rise of 5%, less discount, in brass cases and taper tubes, accompanied by a rise of 1/4d per foot on 2-inch iron taper tubes; brazed iron tubes are advanced £2 per ton, and discounts on solid stair rods are reduced by 2 1/2%; an advance of 10% on Willenhall rim, dead and drawback locks; a notification of a probable further rise of 5% on wrought iron tubes, discounts off, which are now, gas, 67 1/2; galvanized, 52 1/2, and steam, 52 1/2; of 5% less discount on hollow-ware, making it 45%; a rise of 6d per cwt. on Leeds cut nails, making cut clasp 3 to 6 inches, 10/ and bringing cut bills to 15 W. G.; wire nails to 9 W. G., iron and brass rivets to 17 inches; an additional £1 per ton on galvanizing sheets, making 24 W. G., packed in felt, £10. 10/ in London, and 26 W. G., £21. 10/. Besides these changes discounts and quotations are in many cases wholly withdrawn for the time being, owing to the uncertainty of the iron and metal markets.

AT SHEFFIELD,
by the time this letter is deposited in the care of the postal authorities, the heat and turmoil of the most fiercely-contested election the town has ever experienced will be over—as regards the voting, at all events—and the issues raised will have been definitely decided under the aegis of the ballot. It is not germane to my purpose to speculate as to the result, but I may say that whatever may prove to have been the aggregate decision of the voters, the influence of the contest upon the now rapidly-approaching general election will necessarily be great. In the main, the appeal has been upon the foreign policy of the government, although there have been many side issues raised and discussed which may have swayed many voters from the principal considerations of the conflict. During the progress of the "campaign" business has been very largely neglected by principals and others, who have, on one side or the other, concentrated all their energies in efforts to influence votes in favor of or against the candidate (Wortley) who confessedly represents the views of the government on foreign questions. Telegrams received here during the day report much excitement in the town and great confidence in both camps as to the result. I write in total ignorance of the collective choice of the electors, but I am bound to state that if Mr. Wortley should be the chosen man, no greater victory could possibly have been achieved by the ministry of Lord Beaconsfield or in favor of his policy, seeing that Sheffield is a pre-eminently Radical constituency, and has hitherto invariably rejected every Conservative candidate who has presented himself. The victory of Mr. Waddy will, therefore, be natural and in accordance with the traditions of the town, whereas the election of Mr. Wortley will represent a tremendous change in support of a "spirited foreign policy," as carried out by the existing ministry. I mention this in order to show your readers the probable bearings of the election—the most important in many respects which this country has known for a very long series of years. Apart from electioneering matters, it is difficult to extract anything of importance from Sheffield this week, save a few vague statements as to the general condition of business. The heavier branches of the iron and steel trades are fairly brisk, the rail mills and Bessemer departments being especially well engaged. The cast steel houses are receiving better orders, and some of them are increasing their production. Most of the additional demand in this respect is from the United States and the home engineering trades. In wire, edge-tools, files and saws the business doing is about up to an average. The principal cutlery and electroplating firms are very well engaged, but the smaller concerns are not doing as much as is usual at this season of the year.

ANNUAL REVIEW OF THE Manufacturing Industries of Eastern Pennsylvania.

Office of The Iron Age, 220 South Fourth St.,
PHILADELPHIA, December 30, 1879.

It seems almost unnecessary to go into details at a time when all branches of trade are equally prosperous, but as we have done so on previous occasions, we will follow our usual course. In a general way we may say that we find a large increase in the number of hands employed in all departments except shipbuilding, which is exceptionally dull. One year ago we received statements from representative firms in regard to the number of hands on their pay rolls. At that time the aggregate, in round numbers, was about 4500, while at this date, the same firms aggregate over 6000, so that 35% to 40% increase may be regarded as a fair estimate. The most satisfactory feature, however, is that the orders on hand are of such a character as to insure a large business during the coming year. Wages have been advanced about 15%, so that all classes are profiting by the improved condition of affairs.

Ship Building.

This is the only branch in which we have to note any falling off, and in this department the work on hand is very insignificant. In prosperous times from 8000 to 10,000 men are employed in the yards of iron shipbuilders, but at the present time not more than 2500 to 3000 are at work, and these chiefly on repairs which will soon be finished. There is about the usual amount of work going on in ferry-boats, Neale & Levy, of Philadelphia, and the Harlan & Hollingsworth Co., of Wilmington, both having one or two large boats under-way. Several large orders were pending in the early part of last summer, but the sudden advance in the price of iron prevented the contracts being signed, the impression being that the advance was only temporary. In the meantime the orders were postponed, causing

quite a depression at the ship-yards, which still continues. We are informed, however, on the best authority that the contracts may be signed very soon; the vessels are wanted, and as there is now but little prospect of lower prices for iron, it is likely that the parties will decide to build at an early date, although a further advance will effectually shut out business. In Wooden shipbuilding there is a good deal of activity, and prospects in that line are very encouraging.

Locomotives.

One of the most important interests in Philadelphia is that of locomotive building. Activity at the Baldwin Works is generally regarded as an indication of activity in many other departments, such as car building, machine tools and various descriptions of railway equipments and supplies. These cause a heavy consumption of iron, so that the condition of business at this establishment is watched with considerable interest. Through the courtesy of the firm we are enabled to present a comparison of the number of locomotives built this year with the number built in all the years since 1873, which is as follows:

| | | | |
|-----------|-----|-----------|-----|
| 1873..... | 437 | 1877..... | 185 |
| 1874..... | 108 | 1878..... | 298 |
| 1875..... | 130 | 1879..... | 420 |
| 1876..... | 234 | | |

We are also informed that the amount of work on hand will extend pretty well into the spring months, while the applications for additional work seem to indicate a business larger in the coming year than at any previous time. The increase during 1879 has been chiefly for American roads, but the company have had important orders from South and Central America, and especially from Australia. The American Locomotive seems to have completely occupied the field in the direction indicated, and there is little doubt that its supremacy will be maintained. The business of the firm during 1879 is about 60 per cent. greater than in the preceding year, about 2400 men being now employed on full time, against 1500 at this time last year. Of the 292 locomotives built in 1878, 40 for the Russian Government may be regarded as exceptional, so that the increase is really greater than would appear from the comparison of the figures showing the number of locomotives built each year.

Car Building.

In this line there has been continuous activity, and shops that have been closed for years are now running as full as ever, while some firms have been compelled to enlarge their facilities, and are still far behind with their orders. In the car shops in Philadelphia, Wilmington, Harrisburg and vicinity, there are now upward of 5000 men at work, receiving an average advance in wages of about 20 per cent. as compared with 1878. The orders on hand will carry builders well into spring, and from the number of applications from various roads there is little doubt that business during the coming year will be very active. The demand seems to be from all sources, but foreign orders have been chiefly placed with builders on the seaboard, transportation charges from points inland being almost prohibitory. The Jackson & Sharp Company, of Wilmington, recently loaded two vessels with cars for Brazil, and have just received additional orders from the same country. J. G. Brill & Co., Philadelphia, have shipped quite a number to Europe, Australia and South America, and there are evidences of steady growth of the export trade in both freight and passenger cars.

Car Wheels, Tires, &c.

In confirmation of the improvement in other departments connected with the railway interest, we find Car Wheel manufacturers crowded with orders. At the extensive establishment of Messrs. A. Whitney & Son, we learn that business during the past six months has improved very rapidly, and they are now turning out quite as many wheels as at any time since the war. Prospects are said to be of the most encouraging character, and there is no apprehension of serious reaction for the present. This firm are steadily increasing their export trade, but the special activity for the time being is owing to the demand from sources within the United States. Tires have also been in great demand, and such important concerns as the Midvale and the Standard Steel Works, have been crowded with orders. Both establishments have been pushed to their utmost capacity, the demand at this date giving promise of equal activity during the coming year. We have not been informed as to the percentage of increase, but there is no doubt it is very considerable.

Scales.

Riehle Bros. report a considerable improvement in the demand for Scales. Orders have been received from the United States government for Scales and Beams for the various customs departments. They have also received important orders from leading railways, iron works, &c. The Russian government also gave orders for a testing machine, similar in all respects to the one made by this firm for the Pennsylvania Railroad, now in use at Altoona. A large Crane Beam of 120,000 lb. said to be the largest in the world, was also ordered from this firm by the Russian government.

Bolts, Rivets, Spikes, &c.

In this department we find that the demand has been extraordinary, averaging at least 80% greater than in 1878. Such firms in Philadelphia as Hoopes & Townsend, and Corydon Winch, Sternbergh, in Reading, and Gilmor, of Baltimore, have, during the greater part of the year, been running to their utmost capacity. Prices have advanced about 70%, and prospects are said to be most encouraging.

Heavy Machinery, Railway Tools, &c.

The demand appears to have exceeded all anticipations. We find an average increase of at least 50% in the number of hands employed, as compared with this date a year ago. Some firms are running double the number, and the smallest increase reported by any firm is about 20%. It may also be stated that the shops are full of work, and very few are in a position to accept orders unless for delivery late in spring. Some concerns have turned away valuable business, simply because it was impossible to give it attention. Taking the condition of affairs as a whole, it is doubtful if there was ever a time in which more work was being turned out or orders coming in more rapidly than at present. Some business is being done on foreign account, but the home demand is considered the most desirable.

Light Machinery.

The demand has been very satisfactory, and business shows a rapid and important improvement. There is nothing calling for special remark; all the various establishments make similar reports, viz., full of business, with excellent prospects for the coming year.

Steam Engines.

Business has not been active in proportion to other departments. There is some improvement in the demand and a slight increase in prices, but not to such an extent as might have been expected. Inquiries are very numerous, however, and it is anticipated that the incoming year will be more satisfactory than the one now closing. Schleicher, Schumm & Co., manufacturers of the Otto Silent Gas Engine, report a rapidly increasing demand for their specialty. Business during the past year has been steadily improving, the last six months showing an increase of 125%. They are now turning out engines at the rate of about four a week, with prospects of steady improvement.

Shafting, Pulleys, Belting, &c.

In these branches we have reports of a most favorable character. Several of the leading Shafting and Pulley manufacturers report a demand beyond all precedent. One concern is nearly two months behind with orders, and cannot gain on the demand, although running a largely increased force of hands. Belting manufacturers report an increase of business amounting to about 35%. Prices have advanced about 30%. The outlook is quite encouraging, although there is a kind of unfair competition from sellers of foreign goods. These are said to be gotten up cheaply, and although very inferior in quality, are sometimes taken on account of their seeming cheapness.

Hardware Specialties.

In all departments we find a gratifying increase of business, the following communication from the Enterprise Manufacturing Company being a fair representation of reports from several other sources: "Our trade during the present year has shown a steady increase each month over the corresponding periods of the previous year, and our volume of business will be fully 20% in excess of that of 1878. This increase is very gratifying, and we are fully convinced from the 'signs of the times' that an era of prosperity is now and has already dawned upon us. Our trade has been maintained in good and satisfactory condition; the percentage of loss from failures has been very small, and altogether the outlook is quite hopeful. Our stock of goods is now quite low, the active demand having exhausted stock and kept our facilities taxed to meet the requirements of our trade. We shall enter upon the new year with cheerfulness and confidence, believing that continued and increasing activity will prevail in business circles throughout the whole of our United States." The E. M. Co., as mentioned some time ago, are about to make a further extension to their premises, at a cost of nearly \$80,000. The American Machine Company are also largely extending their premises to meet the growing demand for their specialties. They report an increase of business of about 20% during the year, are bare of stock, behind with orders, and regard the incoming year most hopefully. The Pennsylvania Hardware Company, of Reading, write as follows: "The increase in business during the year just closing has been very gratifying indeed—we have trebled our business of 1878. Our stock is low, having been busy all year in filling orders. The prospects for 1880 are of the brightest, many large houses being now in the market placing orders, something very unusual at this season. Our facilities for doing business next year will be very much enlarged and improved, and we look forward to a large and extensive trade during 1880." Rick Bros., of Reading, also report a large increase in their business during the year. They were unfortunate in being partially burned out a week ago, but with characteristic energy they will at once rebuild and make such additions as will largely increase their manufacturing facilities. They expect to be ready to fill orders within two weeks, so that their customers are not likely to suffer inconvenience.

Saws, Files, Edge Tools, Cutlery, &c.

Business throughout the year has been uniformly good, and during the past six months especially has shown rapid improvement. In saws, Messrs. Henry Diston & Sons report an increase in business amounting to about 30%. They say prospects were never better than at present. In Edge Tools an increased business of about 35% is reported. Prices have advanced 15 to 20%, with prospects of a further advance soon. Stocks are light and orders generally about 30 days behind. Messrs. Yerkes & Plumb say: "We think the outlook for 1880 very encouraging, and the legitimate demand for all lines of Hardware far greater than during any similar period." McCaffrey & Bro. report an increased business in Files amounting to 25%. They are carrying less stock than they have done for years, and are considerably behind with their orders. They deprecate too rapid an advance in prices, on the ground of its offering inducements to foreign manufacturers to enter the market again. G. & H. Barnett report as follows: "Our business has increased almost 50% during the past year, and have orders on hand to last for a considerable time to come, and are imported from all sections of the country for goods, the trouble being to supply demand. The advent of the New Year brings with it no less a desire of the buyers to place their orders, and we feel warranted in saying, as our opinion, that the present active state of trade is good for a long time to come, in view of which we are adding very considerably to our facilities in order to more rapidly fill our orders." In the cutlery trade there has been an increase of 25% in the amount of goods manufactured;

prices have advanced 40%. Stocks are exhausted and the prospect for 1880 unusually bright.

Shovels, Agricultural Implements, &c.

Business in this department has been very gratifying, averaging an increase of about 35% compared with 1878. We learn that about 80,000 dozen Shovels have been manufactured in Philadelphia during 1879, with prospects of a still greater business during the coming year. The Kimball Shovel Co., of Baltimore, write us that "sales have largely increased, both in size of orders and new customers, principally for export. We find the stocks in the hands of manufacturers and dealers very light, and the former with as many orders as they can fill for the next two months, so that, as the spring trade opens, it will be more a question of production than price."

Locks.

In this department there has also been a considerable improvement, although the specialties manufactured here are in constant demand and not liable to fluctuations. At the Star Lock Works, Hillebrand & Wolf report an increased business during 1879, amounting to about 35%. They run about 100 hands on full time, and regard the outlook very favorably. Their export trade is chiefly to Germany, although they have recently had orders from Australia. The D. K. Miller Lock Co. have also increased their business very considerably, and expect to do still better during the coming year.

Carriage Bolts, Screws, &c.

The demand for Carriage Bolts has been very heavy, and during the past six months beyond precedent. All the manufacturers are running to their fullest capacity, and are considerably behind with their orders. Welsh & Lea, Coleman Eagle Bolt Works, are employing about 230 hands on full time, and would add to their number if they had room to place them. There are several other important concerns from whom we have no report further than that they are exceedingly busy. The Philadelphia Screw Co. have recently moved into their new building, and expect to do a very large trade during the coming year. They increased in 1878 about 35%, but with superior facilities and improved machinery they expect to double their output in 1880. They have had a steady demand, and nearly always pushed to keep pace with orders.

Foundry Facings, Crucibles, &c.

We find a largely-increased business in these branches, but very little improvement in prices. Prospects in this respect are more favorable, however, and it is quite likely that a general advance will be made early in the new year. Strow, Wile & Co., as we mentioned a year ago, received several orders for Crucibles from Europe. Upon inquiry at the office of the firm a few days ago, we find that the business is now firmly established, orders have been duplicated from time to time, and applications made from other sources also, the latest being from a country in Africa.

Stoves.

The Stove trade has been the largest and the best in years. Sales have been very heavy, and although prices not what they should have been, they are steadily improving, and the business of next year is likely to be on a more satisfactory basis. Many parties took orders early in the season, and when the advance came they were already loaded with business. Stocks have been pretty well exhausted, and Stove manufacturers feel very hopeful in regard to business during the incoming year.

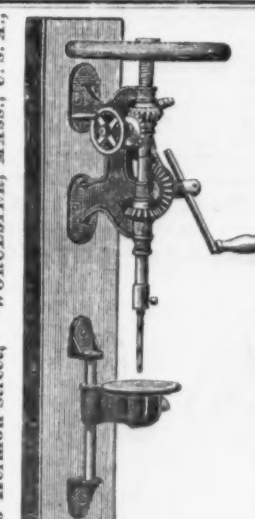
Tin Plate.

This important interest made a rapid advance in Philadelphia during the first eleven months of the year now closing, the receipts being 369,904 boxes, against 288,205 in the same time last year, a total increase of 81,699 boxes. The total shipments to the United States in the same time were 1,591,624, against 1,523,498 in 1878, a gain of 68,126 boxes, from which it appears that Philadelphia is absorbing all the increase and something additional.

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Annual Review of the British Iron Trade of 1879.

(From Our Own Correspondent.)

The state of the iron trade and its allied industries during the year which is now near its close has been in many respects eventful, and attended with changes of greater direct and relative importance than several of its predecessors. At the commencement of 1879 the statistical and general position of this greatest of British industries was in all respects bad, and to the eye of the keenest observer the outlook was one of unrelieved gloom and great anxiety. Abroad, as well as at home, more iron was being produced than was required by the actual consumers; prices were unprecedentedly low, accounts difficult of collection, and scarcely a single person could be found who indulged in the hope of an early or even distantly prospective revival. Ironmasters in all directions found it most difficult to keep themselves above water, financially speaking, which fact, in scores of instances, they only contrived to accomplish by continuing to produce rather than allow their plant and machinery to become idle. They found it better, in fact, to make iron even at a slight loss than to set down their furnaces and let their expensive appliances rust by total disuse. By this very course of action they undoubtedly hindered the prospect of any revival of trade or rise of prices, inasmuch as they only sold a limited proportion of their production, while the remainder served to add to the already overgrown stocks, either in the official stores of Scotland and the North of England, or in makers' own yards elsewhere. They thus helped to defeat the object they at heart most desired, but the circumstances of the case and the needs of each maker were such that the general good was perforce lost sight of, in view of the necessity which so urgently pressed upon the individual.

Everything favored cheaper production than had ever before been known or heard of, yet the market did not budge a single step, and it was most difficult to dispose of even a moderate portion of the iron made. Competition was keener than ever before, and vendors were driven to all kinds of desperate shifts in order to convert their manufactures into ready money. Buyers, who were few in number, and who required but small lots, were more completely masters of the situation than at any previous juncture, naturally fostered every available means of competition among the makers, who were not merely struggling among themselves, but were in many instances actually undersold by merchants or other middlemen, who looked only to the wants of the moment, and had no regard whatever to their future occupation or reputation. In this way, and by these means, comparative chaos reigned during the earlier part of the year, and it was some little time before failures and other powerful causes thinned the ranks of the competitors and reduced the competition within more reasonable limits. By the time the year had got thoroughly "on its legs" the condition of many of our leading iron-making districts had become exceedingly bad, particularly South Staffordshire, where more than three-fourths of the furnaces were set down, and where comparatively few of the once busy mills and forges were in operation. The North of England, Yorkshire, Derbyshire, Lancashire, and parts of Scotland were not in so deplorable a plight, but there was everywhere the evidence of the utmost depression and a general stagnation which nothing appeared able or likely to relieve. As with the iron trade proper, so with its allied industries, all of which were at the lowest possible ebb. The few orders for machinery, &c., which now and again made their appearance were literally sent "all round the country," and makers frequently received inquiries for the same article, required for one order only, from a dozen of the houses they supplied. In this way the cares of business were vastly increased, and there were loud complaints not only as to the actual paucity of orders, but also of the trouble of securing and dealing with those really put forward.

This was virtually the state of affairs throughout almost every branch of the trade during the whole of the earlier part of 1879, and it was not until the advent of spring that any change became apparent. Even then the alteration was principally confined to one department—the steel-rail mills. There had previously been symptoms of growing activity in this respect, but it was not until April that the news respecting Mr. Vanderbilt's American orders for English rails directed closer attention to the matter. It was then suspected that the American manufacturers were unable to effect early deliveries, and it was seen that if such were the case it could only be a question of time for an important improvement to be felt on this side. In the long run that surmise proved to be true, seeing that during the whole of the autumn the rail mills of this country have been well engaged, and are now understood to be well sold forward. This is evidenced by the course of prices, which have gone up from the £4 and £4.6/ per ton of March last, to £7 and £7.10/ at the present time. The different departments subsidiary to the rail mills have naturally benefited in proportion. Hematite pigs, for instance, which were selling at 55/ to 60/ a year ago, have never ceased to rise since midsummer, and are now scarce and firm at £4.17/6 and £5. As regards the iron trade proper, the revival, of which so much has been written and said of late, was not generally expected or realized until some time after the comparative prosperity of the rail mills had begun to be noticeable. There were some few old practised observers, it is true, who scented the approach of the American "boom," and who, even prior to midsummer, made preparations for taking the tide at its flood. Such, however, was not generally the case, and it may safely be stated that the news of the remarkable briskness of the iron trade of the United States, which reached us in August, came upon the ironmasters, &c., of this country in the light of a revelation. From that time to this there has been no looking back, but a general onward march.

The members of the trade seemed all at once to take heart, and to pull themselves together in one great effort to extricate themselves out of the Slough of Despond in which they had so long been plunging. At the first the glad tidings from the West seemed too good to be true. People sagely shook their heads, and asked for better evidence than mere hearsay. They had not long to wait. Firms in Glasgow received orders for Scotch pig iron in considerable quantities. Warrants suddenly became urgently wanted, and they, with makers' brands, rapidly rose from 40/ and 41/6 to 66/ and 67/6. Middlesborough naturally caught the infection, and not merely sent up quotations in sympathy with the enhanced rates declared on the other side of the border, but also decided to ship trial lots of Cleveland pig to the United States. Elsewhere the effect was contagious, and inquiry revealed a far greater and more widespread change than had been suspected. Hematites and other pigs were absolutely scarce for the time being, for it was not until a further period had elapsed that furnace owners and others felt justified in extending their means of production. Crude irons being thus at a premium for the moment, attention was directed to the alternative of purchasing scrap and old rails, especially by those who had American commissions to buy. The effect of this, too, was naturally to send up prices, and not only so, but to clear off vast quantities of old materials which had been accumulated by railway companies and others. Such a clearance was of itself an important factor in the course of business, for it was borne in mind that we also use a good deal of scrap iron, and that in its default pig iron must be resorted to.

The blast furnace owners—particularly those of the North and of Scotland—were not slow to perceive and utilize their advantage. They sent large lots of iron into the official stores in order to get warrants for them, and these securities they sagaciously negotiated in the market on terms which left them fair profits, without at the same time seriously damaging their own ultimate interests. These gentlemen saw the inevitable tendency of things, but a number of speculators of all sorts and sizes, whose acquaintance with iron was of the crudest possible kind, rushed in, and by bidding against each other, quickly sent up quotations into the sixties of shillings. The fever did not last long, however, owing to more definite and fuller acquaintance with the exact wants of America. The speculators were mostly weak-kneed gentlemen who could not afford to wait, and who took fright at the first cold breath of reason which reached them. They were glad to clear out at almost any price, and their frantic efforts in that direction for a time caused a new depression of the Scotch market. A comparatively good revival ensued, when the large shipping returns were published weekly, but for the most part quotations have since been more regular, and "spasms" have been few and far between. In the meantime smelters in other portions of the country had not been idle, but had ranged themselves among the hopeful ones, in doing which they were presently supported by the augmented wants of the finished iron producers, some of whom had received American orders for hoops, cotton ties, &c., while others were supported by additional calls from the tin-plate houses for sheets, &c. In this case activity clearly begat activity.

The merchants, retailers and other home buyers beginning to be apprehensive that the revival was, after all, real, gave out orders long held in abeyance, or bought in advance of their actual requirements, with an amount of unanimity which proved at once the lowness of stocks and the general fear of another period of inflation. What has happened since is a matter of current history, and has found its place weekly in my letters. Market iron has gone up to £8 per ton, and the leading list houses have withdrawn all quotations preliminary to a further rise to £9, or even £10 at the forthcoming quarterly meetings. All other descriptions of iron are dearer in proportion, even common bars having moved up from £5.10/ to £7.10/ per ton. Galvanized iron is £3 to £4 dearer, partially owing to the movement in sheets and partly by reason of the largely increased value of spelter. Tin plates are 30 to 50 per cent. higher than they were a year ago, and appearances are decidedly against the prospect of any downward movement. Stamped and other hardware, wholly or partly composed of iron, are daily showing less discount; while articles into the composition of which tin, copper, or the other metals proper enters more or less largely are equally enhanced in value. To give a mere enumeration of the changes in prices which have taken place within the last two or three months would be tedious and tiresome. I have, therefore, adopted another course, which, for purposes of comparison, will no doubt prove equally interesting and useful to the trade. The year is closing under far more favorable conditions than could possibly have been prophesied twelve or even six months ago. At the present time there is employment, which may be termed ample, in almost every branch. Furnaces, forges and mills, which have been disused for two or three years past, are again being made ready for being reworked. Prices are rising in all directions, and manufacturers' order books are understood to be almost universally well supplied. Our foreign trade shows to great advantage, as compared with the statistics relating to it at the beginning of the year, and our home business—in spite of the bad harvest—is on a very considerable scale. These are all favorable conditions, and may lead up to splendid future results, provided we are content to conduct our operations as men of business who have to live in the future as well as in the present, and not merely act as speculators who care nothing for the time to come so long as the time present can be squeezed to advantage. The state of the home market would seem to forbid the hope of any great immediate rise either in the volume of business or in prices, but there is no apparent reason why 1880 should not prove to be a year of at least average prosperity, in the absence of inflation and speculation.

The completed statistics for 1879, when available, will not only show a marked increase in the production of almost all kinds of iron, particularly pig, but they will also reveal the existence of heavy stocks in Scotland and elsewhere, which must necessarily be taken into account in any calculation as to the course of prices during next spring. With over 300,000 tons in Connal's stores, and a large tonnage (probably over 400,000) in makers' own yards, Scotch pig does not seem likely to experience any great immediate advance, particularly when it is remembered that the production in that country is by no means up to its full extent. In Cleveland, too, the same remark applies, and it has even greater force as regards the South Staffordshire district. In the last-named locality the output within the next three months will be at least treble that of any quarter of the present year, so that it will need a very marked growth of the demand to sustain prices and prevent the occurrence of a collapse. The finished iron trade is better, because in those branches the stocks are probably very small in all directions; hence the wants of consumers must needs be felt by makers as soon as they have been made known. All things considered, the iron trade may be assumed to be in a fairly satisfactory condition at present, although it is not so decidedly strong as some would have us believe. There may be some little hesitation during the next few weeks on the part of buyers, but I am under the impression that those who look for lower figures will be deceived, although, on the other hand, it is scarcely probable that there will be any further great "jump" upward, for the next six months, at all events.

At the beginning of the year the pig iron on hand in Scotland was 679,000 tons, of which 199,417 tons were in Connal's stores, and 479,583 tons in makers' own yards. The production of the year had been 902,000 tons from an average of 90 furnaces. The exact statistics for the whole of 1879 will not be available for some little time ahead, but in the interim the following forecast will be approximately accurate:

| | |
|---|-----------|
| Make of Scotch pig during 1879, say..... | 800,000 |
| Stock on January 1, 1879, official..... | 679,000 |
| Imported from England in 1879, official..... | 252,975 |
| Total..... | 1,731,975 |
| Stock in Connal's stores, Dec. 30, 1879, say..... | 417,000 |
| Exports to Dec. 30, 1879, say..... | 350,000 |
| Malleable iron made in Scotland, say..... | 150,000 |
| Sent to England by rail, say..... | 75,000 |
| Stock in makers' own yards, roughly..... | 430,975 |
| Total..... | 7,731,975 |

PRICES IN DECEMBER, 1879, AND JANUARY, 1880.

| | Jan. 1879. | Dec. 1879. |
|----------------------|------------|------------|
| Pig Iron, No. 1. | £ s. d. | £ s. d. |
| Scotch warrants..... | 3 3 6 | 3 19 9 |
| Gartsherrie..... | 2 9 0 | 1 8 0 |
| Coltness..... | 2 10 6 | 3 8 0 |
| Summerlee..... | 2 8 0 | 3 5 6 |
| Glenarnock..... | 2 7 0 | 3 5 0 |
| Eglington..... | 2 3 0 | 3 2 0 |

| | | |
|--------------------------|--------|-------|
| Middlesborough, G. M. B. | | |
| No. 1 Foundry..... | 1 15 6 | 3 1 6 |
| No. 2 Foundry..... | 1 17 0 | 3 0 0 |
| No. 3 Foundry..... | 1 15 0 | 2 4 6 |
| No. 4 Foundry..... | 1 14 6 | 2 3 0 |
| No. 4 Forge..... | 1 14 0 | 8 5 0 |

| | | |
|-----------------------------------|--------|--------|
| Cleveland Finished Iron. | | |
| Bars, common, ordinary sizes..... | 5 5 0 | 7 0 0 |
| Bars, best..... | 6 0 0 | 8 0 0 |
| Ship plates..... | 5 12 6 | 8 0 0 |
| Boiler plates..... | 6 12 6 | 9 0 0 |
| Angle, T and bulb iron..... | 5 5 0 | 7 10 0 |
| Rails, heavy..... | 5 5 0 | 7 10 0 |
| Rails, light..... | 5 7 6 | 7 0 0 |
| Hematite pigs..... | 2 12 6 | 4 17 6 |

| | | |
|----------------------------------|--------|--------|
| Middlesborough Castings. | | |
| Cast girders..... | 4 7 6 | 5 10 0 |
| Cast-iron chairs, ordinary..... | 3 12 6 | 3 5 0 |
| Cast-iron pipe, 1½ to 2½ in..... | 4 15 0 | 6 0 0 |

| | | |
|--------------------------|--------|--------|
| Staffordshire Iron. | | |
| Common bars..... | 6 0 0 | 8 0 0 |
| Medium bars..... | 6 10 0 | 8 5 0 |
| Branded bars..... | 7 10 0 | 9 0 0 |
| Lord Dudley's..... | 8 2 6 | 9 12 6 |
| Messrs. Barrow's..... | 8 2 6 | 9 12 6 |
| Rivet iron..... | 7 15 0 | 10 0 0 |
| Angles and bulbs..... | 6 10 0 | 7 15 0 |
| Nail rods, common..... | 6 0 0 | 7 10 0 |
| Nail rods, best..... | 7 10 0 | 8 10 0 |
| Hoop iron, ordinary..... | 6 10 0 | 9 0 0 |

| | | |
|--------------------|--------|--------|
| Welsh Iron. | | |
| Bars, common..... | 5 10 0 | 7 10 0 |
| Bars, best..... | 6 0 0 | 8 0 0 |
| Bars, good..... | 6 10 0 | 8 10 0 |
| Bars, puddled..... | 3 10 0 | 5 0 0 |

| | | |
|-----------------------|--------|--------|
| Basemere Steel. | | |
| Sheets, ordinary..... | 15 0 0 | 22 0 0 |
| Rails, ordinary..... | 5 5 0 | 7 10 0 |
| Rails, light..... | 6 0 0 | 8 0 0 |

| | | |
|---|-------|--------|
| Rylands' Warrington Wire. | | |
| Charcoal wire..... per boll..... | 0 4 0 | 0 6 0 |
| Tinned wire..... " " " " " " | 0 5 0 | 0 8 6 |
| Coppered wire..... " " " " " " | 0 0 9 | 0 1 3 |
| Charcoal half-round wire..... " " " " " " | 0 8 0 | 0 13 0 |

| | | |
|--|---------|---------|
| Wire. | | |
| Drawn fencing, No. 6, oiled, f.o.b..... per ton..... | 9 15 0 | 10 5 0 |
| Ditto, No. 8, ditto..... " " " " " " | 10 15 0 | 11 5 0 |
| Ditto, No. 9, ditto..... " " " " " " | 11 10 0 | 12 10 0 |
| Galvanized, No. 6..... " " " " " " | 13 10 0 | 14 10 0 |
| Galvanized, No. 8..... " " " " " " | 15 10 0 | 16 5 0 |

| | | |
|-------------------------------------|--------|--------|
| Fencing staples, kegs extra. | | |
| per cwt..... | 0 14 0 | 0 14 9 |
| Ditto, galvanized..... per cwt..... | 1 1 0 | 1 3 3 |
| Belgian nail rods, in Thames..... | 5 0 0 | 7 10 0 |
| Ditto bars, ditto..... | 5 0 0 | 8 0 0 |
| Ditto girders, ditto..... | 7 10 0 | 9 10 0 |

| | | |
|-------------------------------------|--------|--------|
| Copper in London (½ dia. for cash). | | |
| Sheets and sheathing..... | 69 0 0 | 77 0 0 |
| Tough cake and ingot..... | 69 0 0 | 77 0 0 |
| Best selected ingot..... | 65 0 0 | 73 0 0 |
| Burra Burra..... | 66 0 0 | 74 0 0 |

| | | |
|--|---------|--------|
| Tin. | | |
| English block or ingot, per ton..... | 64 0 0 | 95 0 0 |
| Ditto bars..... | 66 0 0 | 97 0 0 |
| Ditto refined block or ingot, per ton..... | 68 0 0 | 97 0 0 |
| Fine Strain..... per ton..... | 56 10 0 | 91 0 0 |
| Banca..... " " " " " " | 63 0 0 | 92 0 0 |
| Fine Australian..... " " " " " " | 57 0 0 | 93 0 0 |

| | | |
|---------------------------------------|--------|-------|
| Tin Plates. | | |
| Best charcoal, I. C..... per box..... | 1 0 0 | 1 7 6 |
| Second quality..... " " " " " " | 0 18 0 | 1 5 0 |
| Best coke..... " " " " " " | 0 17 0 | 1 3 0 |
| Second quality..... " " " " " " | 0 10 0 | 1 0 0 |

| | | |
|---------------------------------|---------|---------|
| Lead. | | |
| English pig..... per ton..... | 14 17 6 | 18 5 0 |
| Sheet and bar..... " " " " " " | 16 17 6 | 19 0 0 |
| Pipe..... " " " " " " | 19 0 0 | 19 10 0 |
| Patent shot..... " " " " " " | 30 5 0 | 0 0 0 |
| Rad..... " " " " " " | 24 10 0 | 19 10 0 |
| White..... " " " " " " | 24 10 0 | 23 0 0 |
| Genuine ground..... " " " " " " | 27 0 0 | 24 10 0 |

| | | |
|---|--------|--------|
| Quicksilver..... per bottle..... | 6 0 0 | 7 5 0 |
| Spelter. | | |
| Silesian and Rhensish..... per ton..... | 18 0 0 | 0 0 0 |
| English, Swansea..... " " " " " " | 21 0 0 | 20 5 0 |

| | | |
|------------------------------------|---------|---------|
| Zinc. | | |
| Sheet, No. 9, &c..... per ton..... | 20 10 0 | 24 0 0 |
| Zinc, oxide..... " " " " " " | 25 0 0 | 23 10 0 |

| | | |
|--------------------------------|---------|---------|
| Phosphor Bronze. | | |
| II..... per ton..... | 110 0 0 | 115 0 0 |
| VII..... " " " " " " | 125 0 0 | 130 0 0 |
| Bearing metal..... " " " " " " | 105 0 0 | 110 0 0 |

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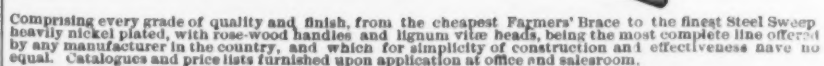
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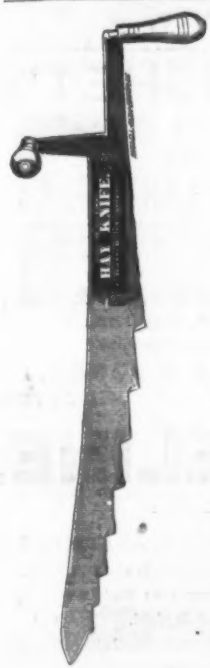
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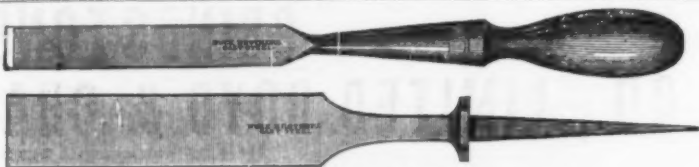
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The Beginnings of the Telegraph.

In 1841 ex-Governor David Wallace was a member of Congress from Indiana and a member of the committee to which Morse's petition for an appropriation was referred. The vote in committee was a tie until Mr. Wallace's name was called, when he gave the deciding vote and the appropriation passed the committee. The failure of this appropriation would have been disastrously discouraging to the inventor, who had then almost lost heart, and the application of telegraphy would probably have been deferred many years.

"One morning," said Mr. Wallace, in an interesting account of the circumstances attending the introduction of telegraphy, "I entered the House of Representatives, and to my astonishment saw a gentleman rise from his seat whom I had never heard open his mouth before unless it was to vote or address the Speaker. 'I hold in my hand,' he said, 'a resolution which I respectfully offer for the consideration of the House.' In a moment a page was at his desk and the resolution was transferred to the Speaker, and by him delivered to the clerk, who read: 'Resolved, That the Committee on Ways and Means be instructed to inquire into the expediency of appropriating \$30,000 to enable Prof. Morse to establish a line of telegraphy between Washington and Baltimore.' The gentleman who offered it was Mr. Ferris, one of the representatives from the City of New York—a man of wealth and learning, but modest, retiring and diffident in his demeanor. It being merely a resolution of inquiry it passed without opposition, and, out of regard to the mover, without comment. In time it came to the Committee of Ways and Means, and when in the order it came before the committee, a scene presented itself I shall not soon forget. The committee was composed of five Whigs and four Democrats. The latter were Mr. Atherton, of New York; John W. Jones, of Virginia; Frank Pickens, of South Carolina, and Dixon H. Lewis, of Alabama. On the Whig side were Millard Fillmore, of New York; Joseph R. Ingersoll, of Pennsylvania; Sampson Mason, of Ohio; Thomas F. Marshall, of Kentucky, and David Wallace, of Indiana. The clerk of the committee read the resolution. The chairman, Mr. Fillmore, in a clear, distinct voice, said: 'Gentlemen, what disposition shall be made of it?' There was a dead pause around the table. No one seemed inclined to take the initiative. I confess that inasmuch as the mover of the resolution in the House was a Democrat, I expected the Democratic side of the committee to stand godfather to it there. But not a bit of it. They gave it no countenance. At length Mr. Ingersoll or Mr. Mason, I cannot now recollect which, broke the ominous silence by moving that the committee instruct the chairman to report a bill to the House appropriating \$30,000 for the purpose named in the resolution. The yeas and nays were taken alphabetically, and to my astonishment I found every Democrat voting 'No,' and Fillmore, Mason, Ingersoll and Marshall voting in the affirmative. My vote would decide it either way. To tell the truth I had paid no attention to the matter. Like the majority around me I considered it a great humbug. I had not the faintest idea of the importance of my vote. But luckily, I recollected that Mr. Morse was then experimenting in the Capitol with his telegraph. He had stretched a wire from the basement story to the anteroom in the Senate Chamber, and it was in my power to satisfy myself in regard to its feasibility. I determined to try it. I asked leave to consider my vote. It was granted. I immediately stepped out of the committee room and went to the ante-chamber. I found it crowded with Representatives and strangers. I requested permission to put a question to the 'madman' at the other end of the wire. It was granted immediately. I wrote the question and handed it to the telegrapher. The crowd cried: 'Read! Read!' In a very short time the answer was received. To my utter astonishment I found that the madman at the other end of the wire had more wit and force than the Congressman at this end. He turned the laugh upon me completely; but, as you know, we Western men are never satisfied with one fall—there never less than two out of three can force from us an acknowledgment of defeat. So I put a second question, and there came a second answer. If the first raised a laugh at my expense, the second converted that laugh into a roar and a shout. I was more than satisfied. I picked up my hat, bowed myself out of the crowd, and, as I passed along the halls and passages of the Capitol, that shout followed me. Of course I voted in the affirmative of the motion then before the committee, and it prevailed. The chairman reported the bill, and it passed the House, if I remember, without asking the yeas and nays."

Governor Wallace's vote for the appropriation defeated him the next fall when he again ran for Congress. His opponent was William J. Brown. He was, I've been told, a shrewd democratic politician, the father of Austin H. Brown. The governor and Mr. Brown stumped the district together, and Mr. Brown all through the campaign used as his most effective weapon against his whig opponent the fact that he had voted for this appropriation. Pointing his finger at the governor, he would say: "And the man who now asks you for your votes has squandered \$30,000 of the people's money, giving it away to Prof. Morse for his electric mag-net-ic tell-lie-graph," with a most ludicrous drawl on the word telegraph. With the rough backwoodsman, and even with the people of the towns, the telegraph in that day was considered some sort of a trick or humbug, and many of Mr. Wallace's staunchest supporters feared there was something wrong in the old gentleman's head when they heard from his own lips that he really had voted the subsidy. One honest old Solby County farmer, Mr. Wallace said, took him by the hand and looked into his face with the tenderest pity. Finally his lip quivered and the tears fell as he sobbed out: "Oh, Davy, Davy, how could you ever vote for that—magnetic telegraph!"

A New Coasting Steamer.—It is reported that the Ocean Line, running between

Savannah and this city, are making arrangements for the building of an iron steamship, which will be larger than the present ships of the line, and will have a capacity for 6000 bales of cotton. She is to be furnished with engines of extra power, so that she is expected to make the run between here and Savannah in 45 hours. The line is now running four steamers per week, and if the business continues to increase as it has done during the past year, it is probable that by next winter there will be a daily steamer between New York and Savannah.

The Regulation of the Temperature of Hot by Cold Blast.

A correspondent of the *Bulletin of the Iron and Steel Association* writes the following:

A point of interest to the pig iron industry has just been settled in the Patent Office. In December, 1877, E. J. Bird, of Iron-ton, Ohio, applied for a patent for mixing cold blast with hot blast to regulate the working of the furnace when it became too gray or too hot. Ten days after this application J. M. Hartman, of Philadelphia, applied for an automatic regulator to regulate the temperature of the hot blast from fire brick stoves when they are on a blow. When they are first started on a blow the temperature is higher than at the end of the blow. To regulate this, and keep the temperature of the blast even, was the object of the latter invention.

As Mr. Bird's claim covered the broad principle of the use of cold blast mixed with hot blast, Mr. Hartman's device could not be operated on account of Mr. Bird's broad claims. The Patent Office put the two cases into interference, and the matter was decided in Mr. Bird's favor on account of priority. An appeal was taken at once on the ground of the public use of mixing cold blast with hot blast for controlling the working of furnaces. Testimony was given in the appeal of its use in 1849 by Joseph C. Kent, of the Andover Iron Company; in 1865 by Joseph Hunt of the Crane Iron Company; in 1870 by Henry Laughlin, of the Eliza Furnaces; in 1873 by Andrew Klonan, of the Lucy Furnaces. By English evidence it was used at Ormesby in 1869, and also at Dudley; this latter evidence was not admitted.

By the decision in the appeal the use of cold blast to mix with hot blast is declared public property. Messrs. Felton, of the Pennsylvania Steel Company, De Saules, of the Dunbar Furnace Company, and Fen-nacy, of the Norton Iron Works, Ky., kindly volunteered any assistance they could give in the case.

Water Meters in Philadelphia.

The Philadelphia *Ledger* says upon this subject in a recent issue:

The cost of the meters, and not the cost of water, in Philadelphia, makes it rather impracticable to put them in just now—that is into all dwellings—so it is hardly worth while to discuss the propriety of gauging, by this means, the water supply to them. Taking the round number, out of our hundred and forty or fifty thousand houses, of the hundred and twenty-five thousand that use the water pipes, the cost to the city of supplying meters all round—a big job—would mount up to anywhere between a million and a half and three millions of dollars, may be more, and is not to be thought of. The manufacturers and large establishments, however, all would be willing to put in meters at their own expense, and ought to have this permission, as the present system can only guess at consumption, and there can be no estimates against waste. The actual cost of water laid on is, by a rough calculation, about one cent to every 150 gallons—say about two hogs-heads. This would not amount to a very heavy tax in dwellings where water is used and not wasted. All the same, it is better for the city's health and comfort that there should be no drawback on the abundant use of water for bathing and cleaning purposes, and for the weekly "wash." The only place, for private dwellings, where meters would be sure to serve a good turn, would be on the outside, on the wash-paves in front, where continual and wasteful slopping goes on. There is no doubt, however, that there would be equity at least, and, possibly, economy to the city, in permitting mills, factories, breweries, distilleries, dye-works, refineries, lively stables and all other places that are now roughly estimated, to put in their own meters and pay accordingly, while there is also no doubt of the advantage they would be to these establishments.

The Gold and Silver Yield.—Wells, Fargo & Co.'s annual circular giving the product of the precious metals west of the Missouri River, including British Columbia, and the receipts in San Francisco by express from the west coast of Mexico, during 1879, places the aggregate products at: Gold, \$32,539,920; silver, \$38,623,812; lead, \$4,185,769. The gross result is less by \$5,805,121 than that of 1878. California shows a decrease in gold of \$140,342, and in silver of \$589,146. Nevada shows a total falling off of \$13,184,235, the yield from the Com-stock being only \$8,830,362, as against \$21,295,043 for 1878. The product of the Eureka District is \$5,859,261, as against \$6,981,406 in 1878. Utah shows a falling off of \$595,734. Colorado shows an increase of over \$8,000,000, chiefly from the Leadville District. It has been exceedingly difficult to arrive at the actual production of Leadville, two of the most reliable estimates varying more than \$2,000,000, and the circular adopts an average. Dakota shows an increased production of \$993,132.

American Railroad Enterprise in Japan.—Recent dispatch from Yokohama, Japan, state that Mr. Crawford, an American engineer, is authorized to make complete purchases of stock and materials for an American railway in Yezo, to extend from the coal fields in the interior through the city of Sapporo, the capital of Yezo, to a port on the northwestern coast, a distance of 53 miles. There was much opposition from European speculators to confiding this work to American hands, but the cheapness of the contracts, combined with sound workmanship in the early stages of the undertaking, conquered strenuous rival efforts.

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AND
SHOE KNIVES.**

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GARDNER BROTHERS,

MANUFACTURERS OF

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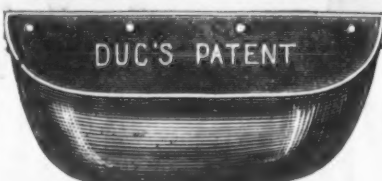
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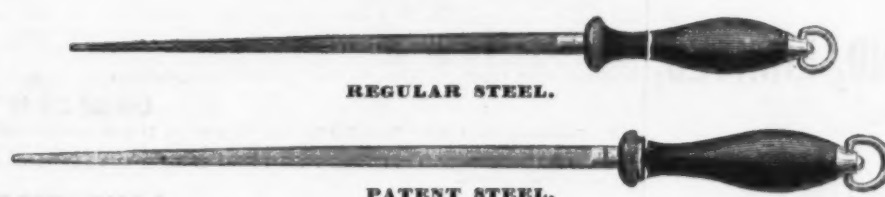
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Manufactory and Offices at Providence, R. I.

The following space will be used in illustrating our specialties, the matter being changed weekly.

IMPROVED BUTCHERS' STEELS.

Patented December 25th, 1877



REGULAR STEEL.

PATENT STEEL.

We give herewith an illustration showing two forms of Butchers' Steels—the Regular and Patent Steel.

In the sharpening of knives two operations are essential: First, that of grinding or otherwise bringing the blade to a thin edge, after which it is to be whetted, or its edge finished down to a proper condition for cutting.

The Patent Steel, above illustrated, is designed to perform both of these operations, being provided with two oppositely located cutting or abrasive surfaces, and two oppositely located smooth or finishing surfaces; the object being that the knife may be brought to an edge upon the abrasive surface, and by a slight turn of the wrist the steel changed into such a position that the knife may be brought to bear upon the two finishing surfaces, without further change or trouble on the part of the operator.

In addition to the improved pattern, we make a steel from the same quality of stock, and of the same style of finish, which we call our Regular Steel, whose entire surface is drawn filed or stripped, after the manner of the well-known "Wilson Steel."

The steels are manufactured from a superior quality of stock, made especially for this purpose, and are finished and mounted in a style unequalled in this line of goods; the handles being enameled in imitation of horn, jet and rose-wood. Every steel stamped with our brand is warranted hard and free from flaws.

We are now prepared to furnish the Regular or Patent Steels, in lengths of 10 or 12 inches, put up in lots of one-half dozen each.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,

Ring Bush Hooks,
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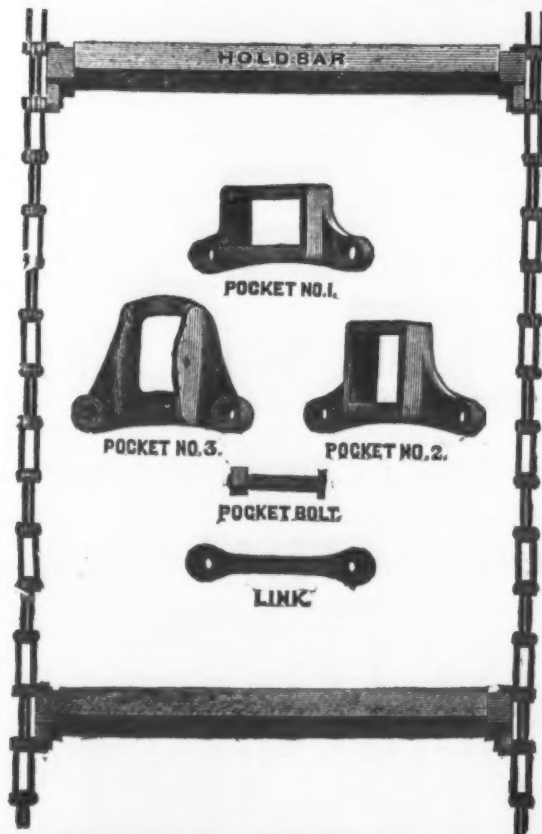
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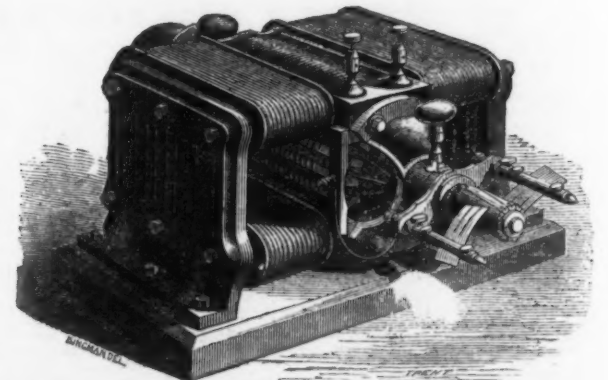
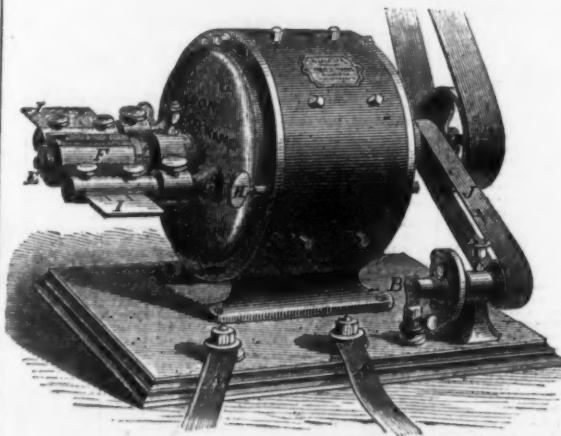
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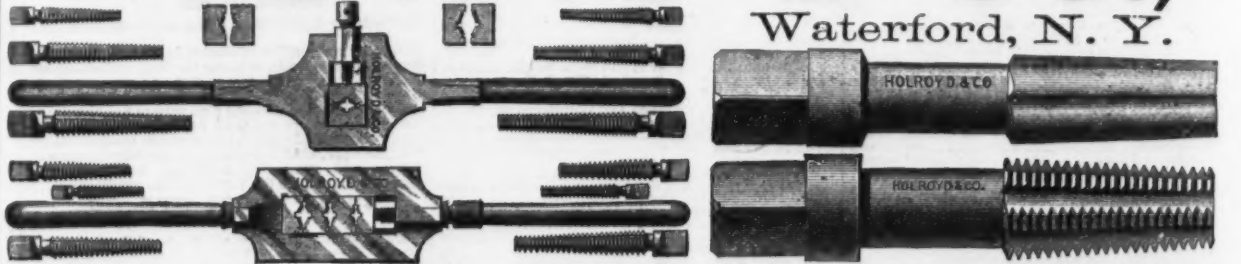
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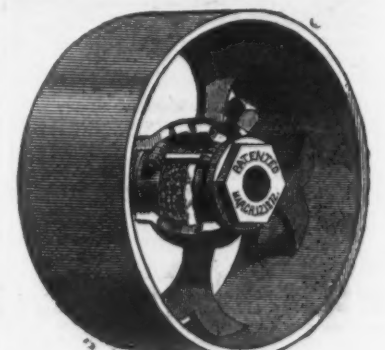
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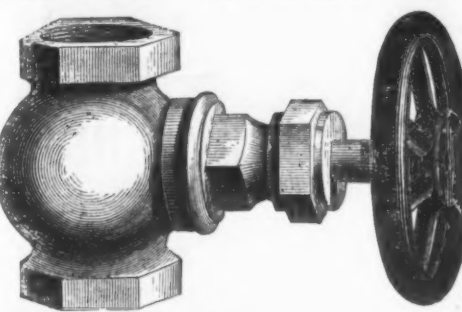
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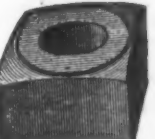
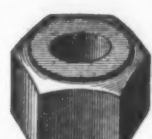
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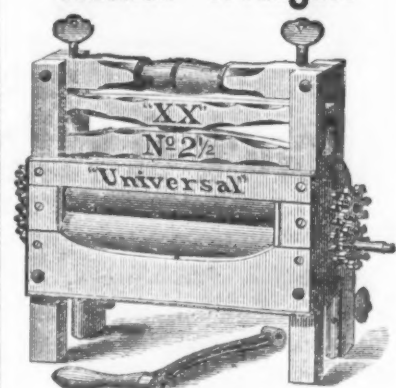
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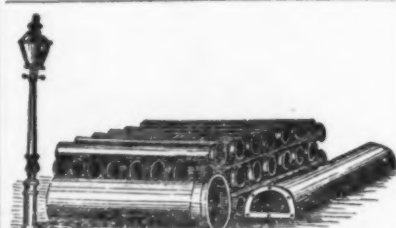
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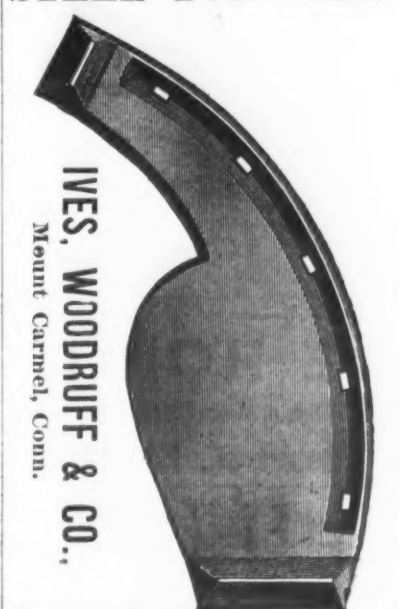
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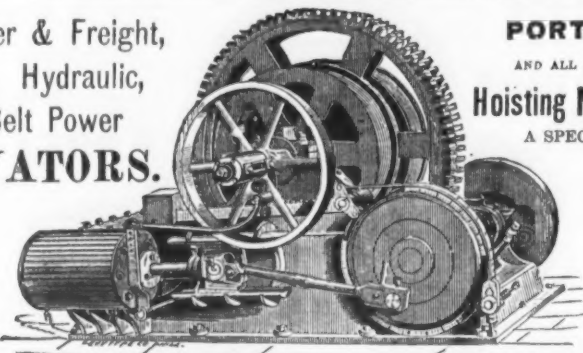
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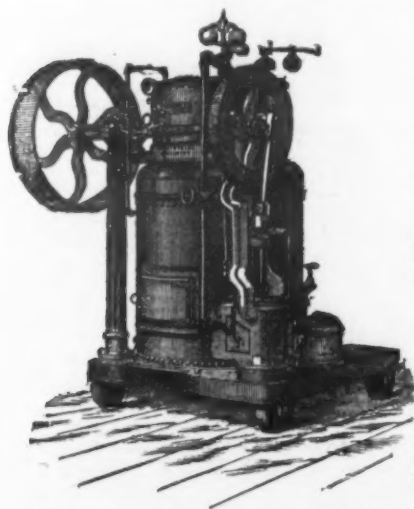


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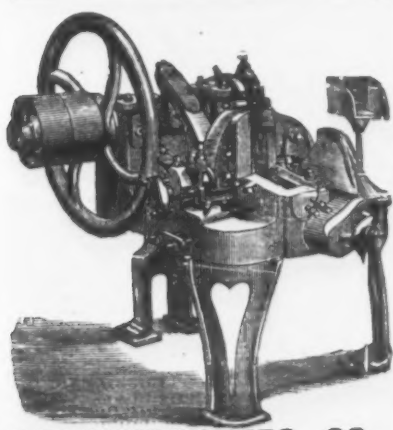
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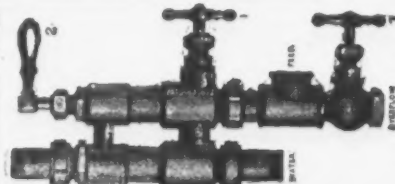
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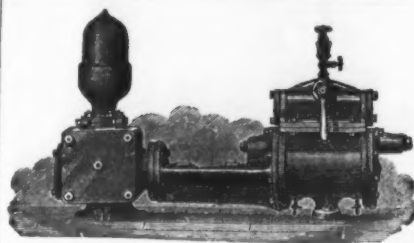
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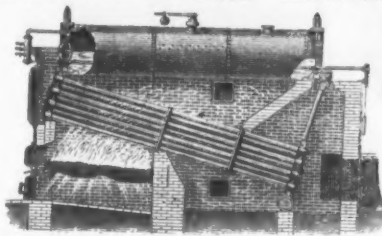
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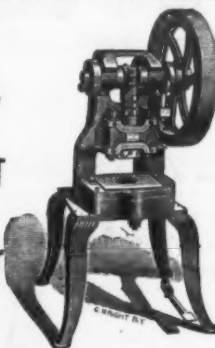
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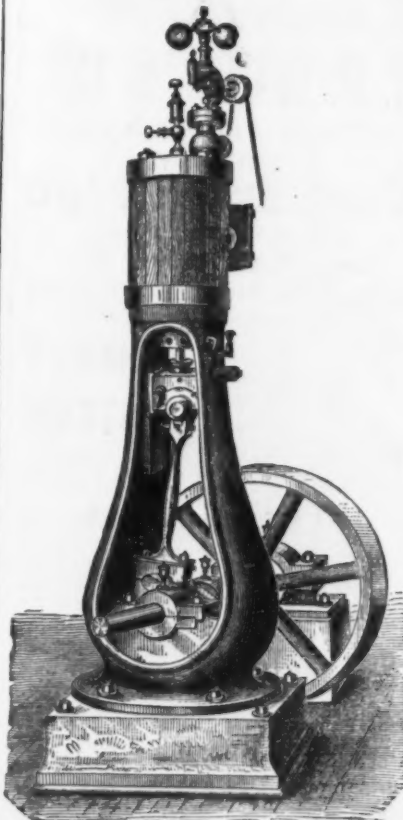
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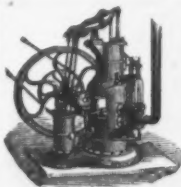


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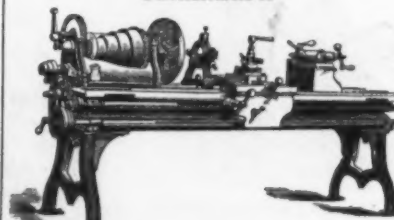
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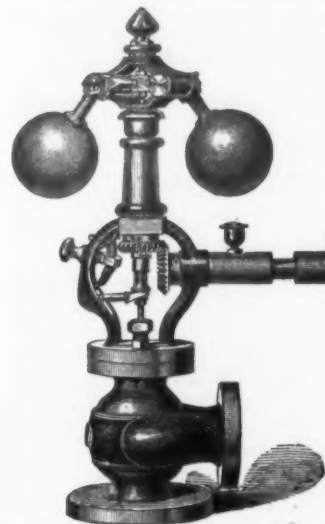
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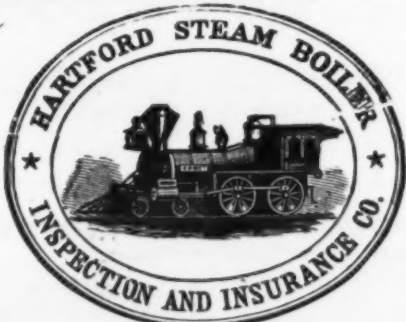


| Size of Governor | Black | Fin-ished | Ball and Lever | Speed-er | Auto-matic Safety Check | Stop Valve |
|------------------|---------|-----------|----------------|----------|-------------------------|------------|
| 1/4 in. | \$16.00 | \$18.00 | \$1.00 | \$2.25 | \$..... | \$4.00 |
| 1/2 " | 18.00 | 20.00 | 2.00 | 2.35 | | 5.00 |
| 3/4 " | 20.00 | 23.00 | 2.35 | 2.50 | | 6.00 |
| 1 " | 23.00 | 27.00 | 2.50 | 2.75 | 8.00 | 7.50 |
| 1 1/4 " | 27.00 | 31.00 | 2.75 | 2.75 | 9.00 | 9.00 |
| 1 1/2 " | 35.00 | 41.00 | 3.50 | 3.50 | 10.00 | 12.00 |
| 2 " | 45.00 | 52.00 | 4.25 | 4.25 | 11.00 | 17.00 |
| 2 1/2 " | 54.00 | 62.00 | 4.50 | 4.50 | 12.50 | 21.00 |
| 3 " | 64.00 | 73.00 | 5.00 | 5.00 | 14.50 | 25.00 |
| 3 1/2 " | 74.00 | 84.00 | 5.50 | 5.50 | 16.00 | 31.00 |
| 4 " | 84.00 | 95.00 | 6.00 | 6.50 | 17.50 | 37.00 |
| 4 1/2 " | 112.00 | 125.00 | 7.00 | 7.50 | 19.00 | 50.00 |
| 5 " | 132.00 | 146.00 | 8.00 | 9.00 | 23.00 | 60.00 |
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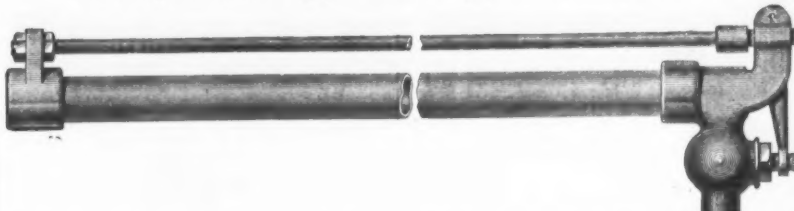
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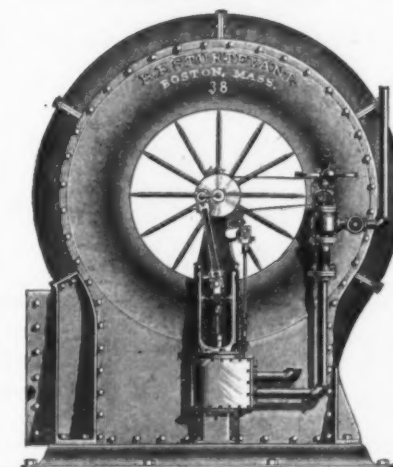
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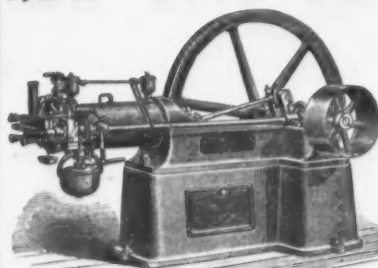
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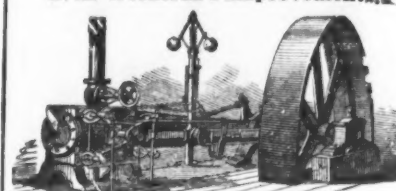
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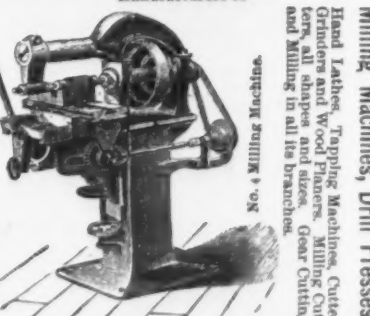
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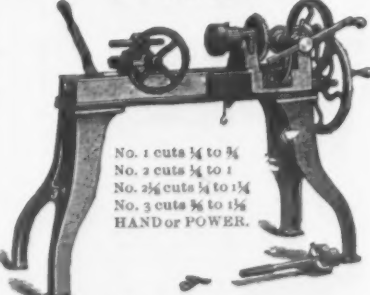
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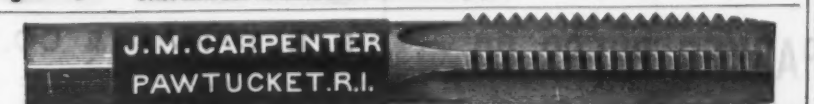
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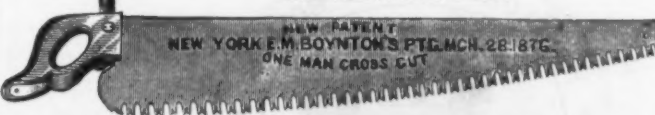


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